C21.5: 958/1

Vol. 958 Number 1

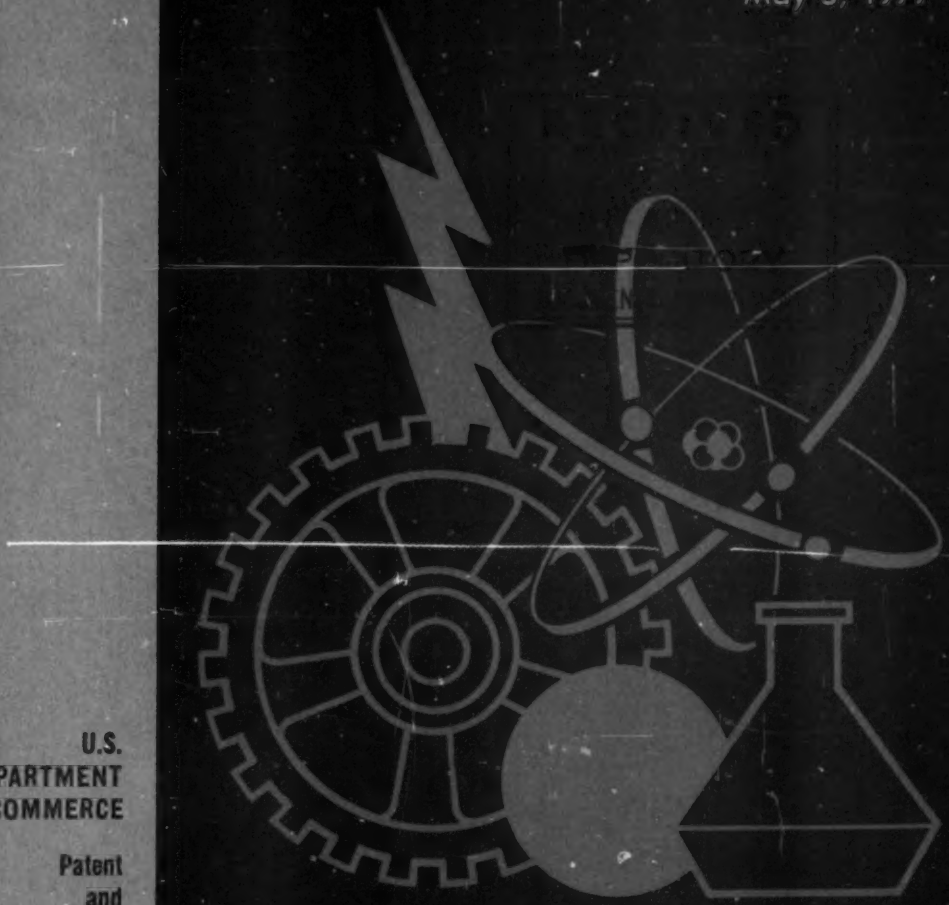
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

May 3, 1977



U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

May 3, 1977 Volume 958 Number 1

CONTENTS

	Page
Patent and Trademark Notices	
Board of Appeals Decisions Rendered in the Month of March 1977	958 OG 2
Patent Notices	
Reissue Applications Filed	958 OG 3
Certificates of Correction for the Week of May 3, 1977	958 OG 4
Adverse Decisions in Interferences	958 OG 4
Disclaimers	958 OG 4
Patents Available for Licensing or Sale	958 OG 5
Dedications	958 OG 9
Condition of Patent Applications	958 OG 10
Defensive Publications (T958,001)	1
Reissue Patents Granted (29,197)	5
Plant Patents Granted (4,046)	9
Patents Granted	
General and Mechanical (4,020,507)	11
Chemical (4,021,196)	245
Electrical (4,021,602)	353
Design Patents Granted (244,156)	443
Index of Patentees	PI 1
Cross Reference of Published Patent Applications Published Under Second Trial Voluntary Protest Program	PI 45
Indices of Applicants of Defensive Publications, Reissues, Plants and Designs	PI 53
Classification of	
Patents (Including Reissues)	PI 57
Designs, Plants and Defensive Publications	PI 60
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 61
Designs, Plants and Applicants of Defensive Publications	PI 63

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of March 1977

Affirmed	220
Affirmed in Part	34
Reversed	69
Total	323

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,871,836, Re. S.N. 777,971, Filed Mar. 15, 1977, Cl. 29/194, CUTTING BLADES MADE OF OR COATED WITH AN AMORPHOUS METAL, Donald E. Polk, Owner of Record: *Allied Chemical Corporation, New York, N.Y.,* Attorney or Agent: Ernest A. Polin, et al., Ex. Gp.: 111

3,872,239, Re. S.N. 777,678, Filed Mar. 15, 1977, Cl. 178/6, FACSIMILE APPARATUS AND METHOD OF OPERATION, Richard L. Nelson, Owner of Record: *Esso Research and Engineering Company, Linden, N.J.,* Attorney or Agent: Donald F. Wohlers, et al., Ex. Gp.: 233

3,872,466, Re. S.N. 777,690, Filed Mar. 15, 1977, Cl. 340/347 NT, INTEGRATING ANALOG-TO-DIGITAL CONVERTER HAVING DIGITALLY-DERIVED OFFSET ERROR COMPENSATION AND BIPOLAR OPERATION WITHOUT ZERO DISCONTINUITY, Ivar Wold, Owner of Record: *Analog Devices, Incorporated, Norwood, Mass.,* Attorney or Agent: Howard M. Bollinger, Ex. Gp.: 236

3,906,014, Re. S.N. 774,996, Filed Mar. 7, 1977, Cl. 260/397.2, 3-DEOXY-1α-HYDROXYCHOLECALCIFEROL, Hector F. Deluca, et al., Owner of Record: *Wisconsin Alumni Research Foundation, Madison, Wis.,* Attorney or Agent: Dugald S. McDougall, et al., Ex. Gp.: 124

3,982,295, Re. S.N. 776,514, Filed Mar. 11, 1977, Cl. 14/71.5, DOCK LEVELING APPARATUS, Peter B. Burnham, Owner of Record: *Inventor,* Attorney or Agent: Eugene J. Mahoney, et al., Ex. Gp.: 352

3,999,965, Re. S.N. 777,606, Filed Mar. 15, 1977, Cl. 55/164, LIQUID TREATING APPARATUS, Harry L. Burgess, Owner of Record: *Inventor,* Attorney or Agent: Bertram H. Mann, Ex. Gp.: 176

PATENT NOTICES

Certificates of Correction for the Week of May 3, 1977

Re. 27,690	3,979,664	4,000,685	4,007,047
Re. 29,095	3,980,235	4,000,755	4,007,051
D. 237,750	3,981,409	4,000,985	4,007,075
D. 242,799	3,981,556	4,001,005	4,007,178
D. 243,151	3,981,658	4,001,147	4,007,211
D. 243,241	3,984,354	4,001,186	4,007,250
D. 243,536	3,985,003	4,001,319	4,007,324
3,721,532	3,985,138	4,001,320	4,007,458
3,796,718	3,985,223	4,001,351	4,007,493
3,848,673	3,985,475	4,001,642	4,007,494
3,862,750	3,988,132	4,001,693	4,007,496
3,866,180	3,988,297	4,001,763	4,007,497
3,873,606	3,989,385	4,002,047	4,007,587
3,881,337	3,989,415	4,002,571	4,007,607
3,905,917	3,990,046	4,002,628	4,007,663
3,915,722	3,991,267	4,002,639	4,007,739
3,917,407	3,991,297	4,002,721	4,007,963
3,927,344	3,992,819	4,002,877	4,008,037
3,933,837	3,993,545	4,003,097	4,008,052
3,934,066	3,993,648	4,003,254	4,008,432
3,935,787	3,993,802	4,003,326	4,008,505
3,937,327	3,993,917	4,003,400	4,008,518
3,938,323	3,993,971	4,003,487	4,008,612
3,941,186	3,994,332	4,003,920	4,008,646
3,947,576	3,994,735	4,003,925	4,008,647
3,947,966	3,995,182	4,004,029	4,008,923
3,951,265	3,995,243	4,004,240	4,008,979
3,951,844	3,995,588	4,004,382	4,009,000
3,955,998	3,995,766	4,004,504	4,009,072
3,957,908	3,995,963	4,004,633	4,009,099
3,958,033	3,996,224	4,004,717	4,009,432
3,959,065	3,996,225	4,004,750	4,009,552
3,960,232	3,996,363	4,004,768	4,009,790
3,963,414	3,996,370	4,004,784	4,009,904
3,963,697	3,996,607	4,004,904	4,009,939
3,963,766	3,997,294	4,005,132	4,009,974
3,964,324	3,997,296	4,005,752	4,010,026
3,965,268	3,997,557	4,005,764	4,010,075
3,965,558	3,998,250	4,005,808	4,010,079
3,966,128	3,999,161	4,005,905	4,010,085
3,966,709	3,999,283	4,005,919	4,010,297
3,968,255	3,999,382	4,005,936	4,010,311
3,970,765	3,999,508	4,005,997	4,010,329
3,971,913	3,999,544	4,006,225	4,010,334
3,972,463	3,999,797	4,006,315	4,010,485
3,973,201	4,000,134	4,006,393	4,010,501
3,973,628	4,000,174	4,006,418	4,011,017
3,973,734	4,000,241	4,006,670	4,011,261
3,974,795	4,000,315	4,006,719	4,011,450
3,979,255	4,000,392	4,006,744	4,011,464
3,979,539	4,000,659	4,006,854	4,011,485

Adverse Decisions in Interferences

In the designated interferences involving the indicated claims of the following patents, final decisions have been rendered that the respective patentees were not the first inventors wtih respect to the claims listed.

Patent No. 3,409,600, P. R. A. Maitha and S. B. Tijssen, ESTERS OF 4,4-DI TERT.BUTYL-PEROXYPENTANOIC ACID AS CROSS-LINKING INITIATORS IN THE MANUFACTURE OF COPOLYMERS OF ETHYLENE AND OTHER TERMINAL ETHYLENICALLY UNSATURATED MONOMERS, Interference No. 99,279, decided Jan. 18, 1977, claims 3 and 4.

Patent No. 3,464,932, J. H. Connelly and G. B. Hares, X-RAY ABSORBING GLASS COMPOSITIONS, Interference No. 97,696, decided Sept. 11, 1975, claims 1, 2, 3 and 4.

Patent No. 3,468,866, A. V. Alferov, B. D. Babitsky, T. K. Vydrina, B. A. Dolgopolsk, V. A. Kormer, V. A. Krol, A. I. Lobach, E. A. Mushina, G. A. Parfenova, S. T. Romanova, E. V. Sakharova, E. I. Tinyakova and O. K. Sharaev, PROCESS FOR POLYMERIZING BUTADINE IN THE PRESENCE OF REACTION PRODUCTS OF π-ALLYLIC COMPLEXES OF TRANSITION METAL AND ORGANIC ELECTRON ACCEPTORS, Interference No. 98,371, decided Nov. 5, 1975, claims 1, 2, 3, 4 and 5.

Patent No. 3,570,513, T. O. Paine Deputy Administrator The National Aeronautics and Space Administration with respect to an invention of R. J. Salvinski and O. O. Fiet, ELECTRO-HYDRODYNAMIC CONTROL VALVE, Interference No. 98,097, decided Nov. 30, 1976, claims 1, 3, 4, 6 and 7.

Patent No. 3,621,659, R. D. Anderson, A. E. Herz, C. Jones, W. K. Wilson and H. Strickland, METHODS OF SOIL COMPACTION, Interference No. 98,153, decided Feb. 13, 1975, claims 1 and 2.

Patent No. 3,761,245, S. P. Bingham, NICKEL SEGREGATION PROCESS USING METALLIC IRON AS REDUCTANT, Interference No. 98,740, decided July 26, 1976, claims 1, 2, 6, 8, 11, 16, 17, 18 and 19.

Patent No. 3,770,342, R. A. Dudragne, DEVICE FOR LIGHTING AND EXAMINING A CAVITY, Interference No. 98,755, decided Jan. 13, 1977, claims 1, 2 and 3.

Patent No. 3,784,077, G. E. Burke, W. G. Lemos and D. M. Shippee, PORTABLE PNEUMATIC FASTENER DRIVING DEVICE WITH IMPROVED ACTUATING MECHANISM, Interference No. 98,800, decided Aug. 20, 1976, claims 1 and 7.

Patent No. 3,794,621, W. Meckel and E. Muller, POLYURETHANE ELASTOMERS PREPARED FROM DIAMINOBENZOIC ACID ESTERS, Interference No. 99,043, decided Feb. 4, 1977, claim 1.

Patent No. 3,832,141, I. Haidopoulos, PRESSURE DIFFERENTIAL FILTERING APPARATUS, Interference No. 99,018, decided Jan. 14, 1977, claims 1, 2, 3, 4 and 5.

Patent No. 3,837,461, H. K. Waibel, PRINT STATION FOR A MATRIX PRINTER, Interference No. 99,372, decided Jan. 26, 1977, claims 5, 6 and 7.

Patent No. 3,931,460, W. H. Watson, VIDEO DISC WITH MULTITURN UNDULATING STORAGE TRACK, Interference No. 99,406, decided Jan. 3, 1977, claim 1.

Disclaimers

Reissue No. 27,976.—*Lloyd W. Sahley*, Shaker Heights, Ohio. DOCUMENT FEEDER. Patent dated Apr. 23, 1974. Disclaimer filed Mar. 4, 1977, by the assignee, *Eastman Kodak Company*.

Hereby enters this disclaimer to claims 1 and 44 of said patent.

Design No. 227,338.—*Olof Backstrom*, Fiskars, Finland. SCISSORS. Patent dated June 19, 1973. Disclaimer filed Mar. 22, 1977, by the assignee, *Oy Fiskars AB*.

Hereby disclaims the claim of said patent for the remainder of the term thereof.

3,239,061.—*Clark Sheldon Horning*, Dover, and *Henry William Jacobs*, York, Pa. AUTOMATIC BACKWASH SAND FILTER AND PROCESS OF CLEANING SAME. Patent dated Mar. 8, 1966. Disclaimer filed Feb. 7, 1977, by the assignee, *Environmental Elements Corporation*.

Hereby enters this disclaimer to claims 5 and 6 of said patent.

3,268,636.—*Richard G. Angell, Jr.*, Highland Park, N.J. METHOD AND APPARATUS FOR INJECTION MOLDING FOAMED PLASTIC ARTICLES. Patent dated Aug. 23, 1966. Disclaimer filed Mar. 4, 1977, by the assignee, *Union Carbide Corporation*.

Hereby enters this disclaimer to claims 1 through 8 of said patent.

3,419,893.—*Carl A. Vahlstrom*, New Britain, Conn. PERMUTATION LOCKS. Patent dated Dec. 31, 1968. Disclaimer filed Feb. 23, 1977, by the assignee, *Emhart Industries, Inc.*

Hereby enters this disclaimer to claims 1, 2, 3 and 7 of said patent.

3,436,446.—*Richard G. Angell, Jr.*, Bridgewater Township, Somerville, N.J. MOLDING OF FOAMED THERMOPLASTIC ARTICLES. Patent dated Apr. 1, 1969. Disclaimer filed Mar. 4, 1977, by the assignee, *Union Carbide Corporation.*

Hereby enters this disclaimer to claims 1 through 12, 16 through 19 and 21 through 25 of said patent.

3,444,171.—*Johan Richard Dahlbom*, Sodertalje, and *Bo Lennart Karlen*, Skarholmen, Sweden. ACETYLENIC IMIDES AND METHOD FOR THEIR PREPARATION. Patent dated May 13, 1969. Disclaimer filed Feb. 4, 1977, by the assignee, *Aktiebolaget Astra.*

Hereby enters this disclaimer to claims 1, 2, 6 and 10 of said patent.

3,854,957.—*John Robert Larry*, Youngstown, N.Y. METALIZATIONS COMPRISING NICKEL OXIDE. Patent dated Dec. 17, 1974. Disclaimer filed Mar. 11, 1977, by the assignee, *E. I. du Pont de Nemours and Company.*

Hereby enters this disclaimer to all claims of said patent.

3,907,085.—*Michel Rist*, Boulogne, France. CLUTCH WITH REMOVABLE HYDRAULIC OPERATOR. Patent dated Sept. 23, 1975. Disclaimer filed Dec. 14, 1976, by the assignee, *Societe Anonyme Francaise du Ferodo.*

Hereby enters this disclaimer to claims 11–15 of said patent.

3,912,562.—*Eugene F. Garner*, Saugus, Calif. LOW TEMPERATURE GAS GENERATOR PROPELLANT. Patent dated Oct. 14, 1975. Disclaimer filed Feb. 22, 1977, by the assignee, *Allied Chemical Corporation.*

The term of this patent subsequent to Aug. 26, 1992, has been disclaimed.

3,945,690.—*Arthur C. Westrom*, Stone Mountain, Ga. ELECTRIC CONNECTOR APPARATUS AND METHOD. Patent dated Mar. 23, 1976. Disclaimer filed Mar. 4, 1977, by the assignee, *Kearney-National Inc.*

Hereby enters this disclaimer to claim 11 of said patent.

3,966,047.—*Larry E. Steiner*, Grand Rapids, Mich. PAPER CURRENCY ACCEPTOR. Patent dated June 29, 1976. Disclaimer filed Feb. 25, 1977, by the assignee, *Rowe International, Inc.*

Hereby enters this disclaimer to claims 1 to 9 of said patent.

3,971,844.—*Raymond T. Schneider*, Lakeland, Fla. METHOD FOR REMOVING SODIUM SULFATE FROM AQUEOUS SOLUTIONS. Patent dated July 27, 1976. Disclaimer filed Feb. 3, 1977, by the assignee, *Davy Powergas Inc.*

Hereby enters this disclaimer to all claims of said patent.

3,998,862.—*Robert R. Kuhn*, Lansdale, and *Warren H. Machleder*, Bluebell, Pa. ALKYL AMMONIUM CARBOXYLITE SALT-ETHOXYLATED ALKYL PHENOL ESTERS. Patent dated Dec. 21, 1976. Disclaimer filed Mar. 9, 1977, by the assignee, *Rohm and Haas Company.*

Hereby enters this disclaimer to claims 1–6 of said patent.

4,000,028.—*Charles E. Hoey*, Marlton, N.J. METHOD OF MAKING ABSORBENT PADS. Patent dated Dec. 28, 1976. Disclaimer filed Mar. 9, 1977, by the assignee, *Rohm and Haas Company.*

The term of this patent subsequent to June 3, 1992, has been disclaimed.

Patents Available for Licensing or Sale

D. 232,796. PLATE TRAY. Clement J. Smith, P.O. Box 15000, Houston, Tex., 77020.

3,839,162. METHOD FOR THE DETERMINATION OF THE CONCENTRATION OF RELEVANT IONS IN AQUEOUS SOLUTION. Heinzgert Ammer, % David Kabin, 305 North Edgeworth St., Greensboro, N.C., 27401.

3,872,610. MATHEMATICS TEACHING APPARATUS. Matt J. Dumovich, 2151 Illion St., San Diego, Calif., 92110.

3,884,465. PRACTICE WEIGHT FOR BOWLING BALLS. Leon Milsner, 90 Island Court, Walnut Creek, Calif., 94595.

3,893,607. LAUDRY SUPPLY TATE DEVICE. John Jones, Rural Route #1, Box 542, Hartford City, Ind., 47348.

3,899,157. TACK FASTENER AND STRIPPER. Robert Thomas, 30 W. Chicago Ave., Chicago, Ill., 60610.

3,907,203. SHOWER EQUIPMENT WITH LIQUID DISPENSOR FOR SHOWER HEAD. Thomas L. Skillings, 511 Latourette St., Oregon City, Oreg., 97045.

3,913,921. MASK FOR BINGO CARD. Aline Bourassa, 3824 Rue Maurice, Faberville Laval, P2 Canada.

3,915,102. WHEEL CHAIR TABLE. Daniel Barron, Rt. #1, Box 94D, Midway, Tenn., 37809.

3,953,983. REFRIGERATION METHOD AND REFRIGERATION APPARATUS FOR CARRYING OUT THE METHOD. Ernest Sander. Correspondence to: Craig & Antonelli, 909 Watergate Office Bldg., 2600 Virginia Ave., NW., Washington, D.C., 20027.

3,958,690. MEDICAL IDENTIFICATION AND MEDICATION PACKAGE. Robert W. Gee, Sr., 18309 Faysmith Ave., Torrance, Calif., 90504.

3,961,386. TOILET SEAT COVER APPARATUS. Ferdinand Beno, 3548 W. 25th St., Chicago, Ill. 60623.

3,972,337. HAIR CUTTING DEVICE. Anthony C. Pomaro, 222 Bay 41 St., Brooklyn, N.Y., 11214.

3,972,811. WASTE CONVERTER SYSTEM AND METHOD. Allan T. Larkins, Jr., and Dalton I. Alander, 120 Canal St., San Rafael, Calif., 94901.

3,979,097. LADDER CADDY USING MULTI-PURPOSE QUICK CHANGE ACCESSORIES FOR HANDYMAN AND TRADESMAN. John A. Balne, 1247 Haig Blvd., Mississauga, Ontario, Canada, L5E2M8.

3,979,146. BEACH CLEANING APPARATUS. Robert M. Berg, 5250 James N., Minneapolis, Minn., 55430.

3,983,977. ELECTRIC EXTENSION CORD REEL. Virgil R. Crobb, 430 East 9th, Port Angeles, Wash., 98362.

3,984,110. CHESS SET. Richard Elkert, 270 Foulois Drive, Loring AFB Maine, 04751.

3,385,885. SAFETY CLOSURE (CHILDPROOF BOTTLE). Michael Epstein, 87–10, 149 Ave., Apt. 15, Howard Beach, N.Y., 11414.

3,988,051. CLAMPING MEANS FOR CLASPING TERMINAL POSTS. Charles T. Robinson, 604 Barbara Rd., Landing, N.J., 07850.

3,989,244. POOL GUIDE-AIMING AND TEACHING DEVICE. Donald Wadina, 644 S. 69th St., Milwaukee, Wis., 53214.

3,990,174. ANIMAL TRAP. Charles B. Sallis, 3828 S. Ellis, Chicago, Ill., 60653.

3,990,177. SNAP-ACTION TOY. Philippe Raymond Joseph Jean Dorsaux, Toulouse, France, assignor to Werner Weber, Tuebingin, Germany. Correspondence to: Klein & Levine, 274 Madison Ave., New York, N.Y., 10016.

3,990,469. BASEMENT DRAINAGE STRUCTURE. Gary D. Ralston, General Delivery, Goose Lake, Iowa, 52750.

3,991,715. FISH SWIMWAY ATTACHMENTS FOR AQUARIUM TANKS. Joseph W. Gibson, Jr., 1215 Hillside Blvd., Carrcroft, Wilmington, Del., 19803.

3,992,005. BILLIARD BALL SPOTTING RACK. J. N. Richey, P.O. Box 4114, Incline Village, Nev. 89450.

3,993,197. LINE TENSIONING DEVICE. Walter Tann, 60–68 69th Ave., Ridgewood, N.Y., 11227.

3,995,414. DISPOSABLE LAWNMOWER GRASS BAG. Frederic L. Kerr, 11613 Albany Drive, Merrionette Park, Ill., 60655.

3,998,758. SUPPORTED CATALYST. Clyde Engineering Service, Robert Clyde, P.O. Box 430820, South Miami, Fla., 33143.

3,999,431. PRESSURE MONITOR. Kauko Ellos Makarainen, 1366 Rosal Lane, Concord, Calif., 94521.

4,002,159. VENETIAN BLIND FOR SOLAR HEATING. Domenick J. Angiletta, 223 E. Knight Ave., Collingswood, N.J., 08108.

4,003,508. CYCLE PACK. Karl S. Hoops, Box 305, Route #6, Idaho Falls, Idaho, 83401.

4,004,820. TRANSPORT CART. Kurt Weber. Correspondence to: Rieter Machine Works, Ltd., CH–8400 Winterthur, Switzerland.

4,005,499. INDIVIDUALIZED BED COVERING. Miriam Travis Klein, 6416 Landview Road, Pittsburgh, Pa., 15217.

4,008,704. UNIVERSALLY ADJUSTABLE FORCED AIR FIREPLACE HEATER. Henry W. Pertie, 5212 Pommeroy Drive, Fairfax, Va., 22030.

The following two patents are offered by Elmer R. Hagen, Royal Arms Apt. #6, 230 W. Genesee St., Auburn, N.Y., 13021.

3,790,043. METHOD AND APPARATUS FOR REMOVING WRINKLES FROM SLACKS OR THE LIKE.

3,893,706. CHILDREN'S RIDING TOY.

Masco Corporation of Indiana offers to grant non-exclusive licenses on reasonable terms under the following 2 patents.

3,961,261. CRYSTALLESS SCANNING RADIO RECEIVER.

3,962,644. CRYSTALLESS SCANNING RADIO RECEIVER CONTROLLED BY PROCESSING MEANS.

Inquiries for license under these patents may be addressed to: Patent Counsel, Masco Corporation, 21001 Van Born Road, Taylor, Mich., 48180.

The following U.S. patents have been issued on inventions resulting from the Inter-Industry Emission Control Program (also known as IIEC) and are available for nonexclusive licensing on reasonable terms for the purpose of reducing automotive pollution. The patents are assigned to individual parties of the program, and information can be obtained by writing to the respective assignee at the address listed below. Corresponding and other foreign patents also are available.

3,630,021. INTERNAL COMBUSTION ENGINE INCLUDING MEANS FOR REDUCING EMISSIONS. Ford Motor Company, The American Road, Dearborn, Mich. 48121, Attn: W. D. Compton.

3,670,496. VEHICULAR AIR POLLUTANT REDUCING DEVICE HAVING A BYPASS MECHANISM. Nissan Motor Co., Ltd., 17–1, 6–chome, Ginza, Chuo-ku, Tokyo, Japan.

3,673,993. AIR POLLUTION PREVENTIVE SYSTEM FOR MOTOR VEHICLES. Nissan Motor Co., Ltd., 17–1, 6–chome, Ginza, Chuo-ku, Tokyo, Japan.

3,855,388. METHOD OF PREPARING OXIDATION CATALYST FOR PARTIALLY COMBUSTED GASES. Mobil Oil Corp., 150 E. 42nd St., New York, N.Y. 10017.

3,861,143. HIGH TEMPERATURE PROTECTIONAL APPARATUS FOR ENGINE EMISSION CATALYTIC CONVERTER. Mobil Oil Corp., 150 E. 42nd St., New York, N.Y. 10017.

3,867,309. CATALYST COMPOSITIONS FOR REMOVING NOXIOUS COMPONENTS FROM A GASEOUS STREAM. Mobil Oil Corp., 150 E. 42nd St., New York, N.Y. 10017.

3,914,377. CATALYST REACTOR FOR OXIDIZING CARBON MONOXIDE AND HYDROCARBON IN GASEOUS STREAM. Mobil Oil Corp., 150 E. 42nd St., New York, N.Y. 10017.

3,950,491. REACTIVATION OF AUTOMOBILE EXHAUST OXIDATION CATALYST. Mobil Oil Corp., 150 E. 42nd St., New York, N.Y. 10017.

3,953,576. MAXIMIZING CONVERSION OF NITROGEN OXIDES IN THE TREATMENT OF COMBUSTION EXHAUST GASES. Amoco Oil Company, P.O. Box 400, Naperville, Ill. 60540.

General Motors Corporation is prepared to grant non-exclusive licenses under the following patents upon reasonable terms.

Application for license may be addressed to the Director, Patent Section, General Motors Building, 3044 W. Grand Blvd., Detroit, Mich., 48202.

3,770,044. METHOD OF DEWAXING SHELL MOLDS.

3,772,767. CASING JOINING.

3,773,396. SHAFT SUPPORTING ASSEMBLY INCLUDING A FLUID DEFLECTING BEARING SPACER.

3,778,186. RADIAL DIFFUSER.

3,778,752. CONNECTOR CONTACT INCLUDING AN ISOLATION RESISTOR.

3,779,884. METHOD OF PRODUCING ZIRCONIUM DIFFUSION BARRIER IN TITANIUM-SILICON CARBIDE COMPOSITE MATERIALS.

3,780,529. COMBUSTION APPARATUS.

3,781,128. CENTRIFUGAL COMPRESSOR DIFFUSER.

3,785,785. SOLID SURFACE LUBRICANT COATING.

3,788,228. FIRING CIRCUIT.

3,788,763. VARIABLE VANES.

3,810,711. COOLED TURBINE BLADE AND ITS MANUFACTURE.

3,814,313. TURBINE COOLING CONTROL VALVE.

3,814,994. FOUR TERMINAL POWER TRANSISTOR.

3,834,001. METHOD OF MAKING A POROUS LAMINATED SEAL ELEMENT.

3,851,465. ANNULAR DILUTION ZONE COMBUSTOR.

General Electric Company is prepared to grant non-exclusive licenses under the following 2 patents on reasonable terms to domestic manufacturers.

Applications for licenses under the following patents may be addressed to: Patent Counsel Ordnance Systems Department, General Electric Company, 100 Plastics Ave., Pittsfield, Mass., 01201.

3,896,356. A METHOD AND CONTROL SYSTEM FOR IMPROVED STABILITY OF AN INDUCTION MOTOR VIA INDEPENDENT VOLTAGE, SYNCHRONOUS FREQUENCY, AND SLIP FREQUENCY CONTROL AT AN OPERATING POINT.

3,938,256. QUICK SETTLING GYROCOMPASS HAVING INTERAXIS DECOUPLING COMPENSATION FOR IMPROVED RESPONSE TIME.

Application for license may be addressed to Patent Counsel, Turbin Operations, Turbine Patent Operation, General Electric Company 1, River Road, Building 43—Room 115, Schenectady, N.Y., 12345.

3,934,459. TORQUE MONITORING SYSTEM FOR ROTATING SHAFT.

3,934,460. APPARATUS FOR FOCUSING AND COLLIMATING ULTRASONIC WAVES.

3,971,219. TURBINE CONTROL SYSTEM.

3,987,237. ELECTRIC FURNACE WALL CONSTRUCTION.

3,987,325. SHORT-CIRCUITING RINGS FOR DYNAMOELECTRIC MACHINE.

Applications for licenses may be addressed to the General Electric Company, Appliance Components Business Division, 1635 Broadway, Fort Wayne, Ind. 46804.

3,826,934. NONREVERSIBLE MOTOR.

3,982,398. THERMAL ACTUATOR, METHOD OF CONTROLLING SUCH AND ACTUATING SYSTEM.

3,983,349. ELECTRICAL SWITCH.

3,983,433. WIRE STATOR CORE STRUCTURE AND METHOD OF MAKING SAME.

3,983,434. SEGMENTED STATOR CORE STRUCTURE AND METHOD FOR MAKING SAME.

3,983,435. STATOR ASSEMBLY FORMED OF FLAT, STRIP MATERIAL.

3,984,650. FLUID PRESSURE DIAPHRAGM SWITCH HAVING PLURAL ADJUSTMENT MECHANISMS.

3,997,805. RESILIENT ELECTRIC MOTOR BEARING SEAL.

Applications for license may be addressed to the Group Patent Counsel, Major Appliance Business Group, General Electric Company Appliance Park, Louisville, Ky., 40225.

3,532,631. METHOD OF OPERATING COMPRESSION TYPE REFRIGERATION SYSTEM.

3,695,811. PILOT AND MAIN FUEL GAS SUPPLY MEANS FOR PRESSURIZED GAS-FIRED SPACE HEATER.

3,837,917. DISHWASHER.

3,841,342. DISHWASHER AND SPRAY SYSTEM THEREFOR.

3,987,683. POLY-V-BELT AND PULLEY MECHANISM.

3,991,393. SERVOMECHANISM CONTROL CYLINDER.

3,993,635. FLAME RESISTANT POLYSTYRENE.

3,996,699. REFRIGERATOR DOOR CLOSURE APPARATUS.

3,997,072. COMPACTOR CONTAINER WITH REMOVABLE BOTTOM.

3,997,292. LAUNDRY MACHINE.

4,003,225. LINT FILTER FOR AUTOMATIC WASHER.

4,004,221. TEST DEVICE AND METHOD OF CHECKING CIRCUITRY.

4,007,037. COMPOSITION AND METHOD FOR CHEMICALLY ETCHING COPPER ELEMENTS.

Application for licenses under the following 8 patents may be addressed to: Group Patent Counsel, Major Appliance Business Group General Electric Company, Appliance Park, Louisville, Ky., 40225.

3,969,137. CONDUIT FOR TRANSMITTING WASHING LIQUID TO AN UPPER SPRAY ARM IN A DISHWASHER.

3,972,550. ALIGNING-SECURING APPARATUS FOR A REFRIGERATOR DOOR.

3,981,456. FOOD PARTICLE MACERATING MEANS.

3,984,163. CANTILEVER SLIDING SHELF INCLUDING A SHELF REMOVAL NOTCH ON ONE SIDE ONLY.

3,984,201. LAUNDRY MACHINE AND METHOD OF WASHING CLOTHES.

3,990,262. NATURAL DRAFT REFRIGERATOR INCLUDING APPARATUS FOR PERMITTING THE CONDENSER TO MOVE BETWEEN A SHIPPING POSITION AND AN IN-USE POSITION.

3,990,318. ACCUMULATING CONTROL CLUTCH MECHANISM.

3,990,756. SELF-ALIGNING, SELF-ADJUSTING DISHWASHER RACK.

Application for license may be addressed to the General Electric Company, Division Patent Counsel, Housewares and Audio Business Division, 1285 Boston Ave., Bridgeport, Conn., 06602.

3,869,816. STEAM IRON.

3,992,785. HAIR DRYER HOOD.

Application for license should be addressed to: Division Patent Counsel, Lamp Business Division, General Electric Company, Nela Park, Cleveland, Ohio, 44112.

3,636,342. MOUNTING BRACKET FOR PHOTOGRAPHIC FLASHGUNS.

3,639,722. PROCESS FOR JOINING WIRES TO SHEETS OF REFRACTORY MATERIALS.

3,668,421. PHOTOFLASH LAMP ARRAY WITH AUTOMATIC SWITCHING.

3,670,639. FLEXIBLE ELECTRONIC INTEGRATED CIRCUIT CAMERA CONTROL ASSEMBLY.

3,707,903. FLASH INDICATOR FOR PHOTOFLASH LAMPS.

3,714,407. PHOTOFLASH LAMP ARRANGEMENT HAVING THERMALLY ACTUATED CONTROL.

3,728,068. PHOTOFLASH LAMP ARRAY HAVING FLASH-ACTUATED SWITCHES.

3,728,947. STATIC ELECTRONIC PHOTOFLASH ASSEMBLY AND METHOD OF PHOTOFLASH LIGHTING.

3,738,791. ARC GAP CONSTRUCTION FOR FLASHING HIGH-VOLTAGE PHOTOFLASH LAMPS.

3,742,298. ARC GAP CIRCUITS FOR FLASHING HIGH-VOLTAGE PHOTOFLASH LAMPS.

3,746,906. ADAPTER BASE FOR ELECTRIC LAMP.

3,748,084. PHOTOFLASH FIRING CIRCUIT EMPLOYING PARALLEL RESISTOR-DIODE COMBINATIONS.

3,758,768. MULTILAMP PHOTOFLASH ARRAY.

3,774,511. CONTACT-LESS INITIATION OF LIGHT EMISSION FROM PHOTO LAMPS SYNCHRONIZED WITH CAMERA OPERATION.

3,787,167. CURRENT-SENSING CIRCUIT FOR DETERMINING FLASHING OF A PHOTOFLASH LAMP.

3,813,205. ULTRASONICALLY ETCHED PHOTOFLASH LAMP.

3,836,824. MOUNTING ARRANGEMENT FOR FLEXIBLE CIRCUIT.

3,860,856. LATCHING CIRCUITRY IN A CIRCUIT FOR SEQUENTIALLY FIRING PHOTOFLASH LAMPS.

3,864,606. COMPENSATED SEQUENCING CIRCUIT FOR FIRING PHOTOFLASH LAMPS.

3,872,560. METHOD OF FORMING BEADED LEAD-IN WIRES FOR LAMPS.

3,873,260. PHOTOFLASH LAMP.

3,873,261. PHOTOFLASH LAMP.

3,895,265. SEQUENCING CIRCUIT FOR FIRING PHOTOFLASH LAMP IN PREDETERMINED ORDER.

3,901,748. METHOD OF TREATING PHOTOFLASH LAMP CONSTRUCTION.

3,930,784. PHOTOFLASH LAMP HAVING NON-SHORTING CONSTRUCTION.

3,941,555. NON-SHORTING PHOTOFLASH LAMP.

Application for license should be addressed to: General Electric Company, 100 Woodlawn Ave., Pittsfiled, Mass., 01201.

3,640,556. TAB WELDED JOINT AND METHOD OF MAKING.

3,801,727. COMPOSITE ELECTRICAL TRANSFORMER HOUSING.

3,825,148. HERMETIC SEALING SYSTEM FOR PLASTIC TANK AND COVER.

3,829,546. SEALING OF MOLDED BUSHINGS.

3,955,264. CORE STEEL STACKING MACHINE.

3,959,543. NON-LINEAR RESISTANCE SURGE ARRESTER DISC COLLAR AND GLASS COMPOSITION THEREOF.

Applications for license may be addressed to the General Electric Company, Transportation Systems Business Division, 2901 East Lake Road, Erie, Pa., 16531.

3,937,855. METHOD OF CURING VACUUM PRESSURE IMPREGNATED COILS.

Re. 28,517. FILTER-TO-LINE TRANSIENT ISOLATOR.

Applications for license may be addressed to: General Electric Company, Contractor Equipment Business Division, P.O. Box 148, Hartford, Conn., 06101.

3,805,357. AUTOMATIC STATOR CORE WEDGING MACHINE. R. W. Peters.

3,882,830. STATOR CORE WINDING MACHINE. R. W. Peters.

Application for license under the following patent should be addressed to: Patent Counsel, Drive Systems Department, General Electric Company, 1501 Roanoke Blvd., Salem, Va., 24153.

3,961,234. ADAPTIVE FILTERING.

Applications for license may be addressed to: Division Patent Counsel, Switchgear & Distribution Transformer Division, General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa., 19142.

3,973,169. OVERVOLTAGE PROTECTION FOR HIGH VOLTAGE SHUNT CAPACITOR BANKS.

3,805,357. AUTOMATIC STATOR CORE WEDGING MACHINE. Patented on Apr. 23, 1974, on an application by Robert W. Peters.

3,822,830. STATOR CORE WINDING MACHINE. Patented on July 9, 1974, on an application by Robert W. Peters.

4,001,674. METHOD OF TESTING THE VOLTAGE WITHSTAND ABILITY OF A HIGH VOLTAGE D-C CABLE AT A VOLTAGE HIGHER THAN ITS NORMAL OPERATING VOLTAGE WHILE CARRYING CURRENT.

The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the following patents.

Inquiries respecting licenses under these patents should be addressed to: RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y., 10036.

3,995,801. METHOD OF STORING SPARE SATELLITES IN ORBIT.

3,995,845. ULTRASONIC WIRE BONDING CHUCK.

3,996,051. CONTROLLED ANGLE VIEWING SCREENS BY INTERFERENCE TECHNIQUES.

3,996,260. ALKOXYBENZYLIDENE - AMINOBENZONITRILES.

3,996,440. MULTIPOSITION ROTARY SWITCH WITH DETENT MEANS.

3,996,498. CURRENT LIMITING CIRCUIT AND METHOD.

3,996,524. LINEAR AMPLIFIER UTILIZING ADAPTIVE BIASING.

3,996,527. GAS LASER OPTICAL SYSTEM.

3,996,529. VARACTOR TUNING APPARATUS FOR A STRIP TRANSMISSION LINE DEVICE.

3,996,531. OSCILLATOR CIRCUIT WHOSE FREQUENCY IS VOLTAGE CONTROLLABLE WHICH CONTAINS A COMPARATOR.

3,996,535. MICROWAVE BULK ACOUSTIC DELAY DEVICE HAVING TWO TRANSDUCERS ON THE SAME SURFACE AND METHOD OF MAKING SAME.

3,996,536. METAL - INSULATOR - SEMICONDUCTOR DEVICE PHASE SHIFTER.

3,996,542. DEFLECTION YOKE HAVING NONRADIAL WINDING DISTRIBUTION.

3,996,587. SEMIPASSIVE RESPONDER UTILIZING A LOW VOLTAGE, LOW POWER DRAIN REFLECTIVE VARACTOR PHASE MODULATOR.

3,996,589. MONOPULSE RADAR SYSTEM.

3,996,606. COMB FILTER FOR VIDEO PROCESSING.

3,996,608. HUE CORRECTION APPARATUS HAVING A RESTRICTED RANGE.

3,996,609. AMPLIFIER SUITABLE FOR USE AS A COLOR KINESCOPE DRIVER.

3,996,610. COMB FILTER APPARATUS FOR VIDEO PLAYBACK SYSTEMS.

3,997,137. MINIMIZATION OF RESIDUAL SPACECRAFT NUTATION DUE TO DISTURBING TORQUES.

3,997,379. DIFFUSION OF CONDUCTIVITY MODIFIERS INTO A SEMICONDUCTOR BODY.

3,997,687. METHOD OF PREPARING OPTICAL WAVEGUIDES.

3,997,716. DISC RECORD LOCKED GROOVE ESCAPE APPARATUS.

3,997,717. ULTRASONIC WAVE RADIATION PATTERN DISPLAY SYSTEM INCORPORATING PHASE CONTRAST MEANS.

3,997,807. MECHANICALLY ADJUSTABLE ELECTRON GUN APPARATUS.

3,997,830. SATELLITE BATTERY RECONDITIONING SYSTEM AND METHOD.

3,997,910. SEMICONDUCTOR DEVICE WITH SOLDER CONDUCTIVE PATHS.

3,998,409. MINIMIZATION OF SPACECRAFT ATTITUDE ERROR DUE TO WHEEL SPEED REVERSAL.

3,999,140. BIAS CURRENT CIRCUIT.

3,999,141. CONTROLLABLE GAIN SIGNAL AMPLIFIER.

3,999,205. RECTIFIER STRUCTURE FOR A SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE.

3,999,217. SEMICONDUCTOR DEVICE HAVING PARALLEL PATH FOR CURRENT FLOW.

3,999,219. TAPE CARTRIDGE PLAYER WITH CARTRIDGE PULL-IN MECHANISM.

3,999,283. METHOD OF FABRICATING A PHOTOVOLTAIC DEVICE.

3,999,356. PANEL EDGE FASTENER CLIP.

3,999,729. BACKUP WHEEL FOR A THREE AXIS REACTION WHEEL SPACECRAFT.

3,999,858. METHOD OF ALIGNING A LASER DEVICE.

4,000,412. VOLTAGE AMPLITUDE MULTIPLYING CIRCUITS.

4,000,415. TRANSFERRED ELECTRON DEVICE PULSE TRAIN GENERATOR.

Re. 29,113. TRIANGULAR PIEZOELECTRIC TRANSDUCER FOR RECORDING VIDEO INFORMATION.

4,001,099. PHOTOSENSITIVE CAMERA TUBE TARGET PRIMARILY OF LEAD MONOXIDE.

4,001,496. DEFECT DETECTION AND CONPENSATION APPARATUS FOR USE IN AN FM SIGNAL TRANSLATING SYSTEM.

4,001,501. SIGNAL PROCESSING CIRCUITS FOR CHARGE-TRANSFER IMAGE-SENSING ARRAY.

4,001,606. ELECTRICAL CIRCUIT.

4,001,607. DRIVE CIRCUIT FOR A GATE SEMICONDUCTOR DEVICE.

4,001,608. ECL SWITCHING CIRCUIT FOR PRODUCING NONCOMPLEMENTARY, TIME COINCIDENT SIGNALS.

4,001,613. PROXIMITY SENSING CIRCUIT.

4,001,618. ELECTRON DISCHARGE IMAGE TUBE WITH ELECTROSTATIC FIELD SHAPING ELECTRODE.

4,001,619. MODULATION MASK FOR AN IMAGE DISPLAY DEVICE.

4,001,620. MODULATION MASK FOR AN IMAGE DISPLAY DEVICE.

4,001,690. METHOD AND APPARATUS FOR COMPENSATION OF DOPPLER EFFECTS IN SATELLITE COMMUNICATION SYSTEMS.

4,001,720. GAS LASER.

4,001,723. OSCILLATOR CIRCUITS.

4,001822. ELECTRONIC LICENSE PLATE FOR MOTOR VEHICLE.

4,001,872. HIGH - RELIABILIY PLASTIC - PACKAGED SEMICONDUCTOR DEVICE.

4,001,876. COLOR CORRECTION CIRCUIT FOR VIDEO RECORDERS.

4,001,877. METHOD OF MEASURING COLOR PURITY TOLERANCE OF A COLOR DISPLAY TUBE.

4,001,878. CHARGE TRANSFER COLOR IMAGERS.

4,002,735. METHOD OF SENSITIZING ELECTRON EMISSIVE SURFACES OF ANTIMONY BASE LAYERS WITH ALKALI METAL VAPORS.

4,002,901. PHOTODETECTOR NON - RESPONSIVE TO CERENKOV RADIATION.

4,002,941. SHADOW MASK CATHODE RAY TUBE SHIELD.

4,002,965. SYNCHRONIZED AND REGULATED POWER SUPPLY.

4,003,049. DUAL MODE AUTOMOBILE COLLISION AVOIDANCE RADAR.

4,003,050. FULL RANGE CORRELATOR FOR USE IN A COLLISION AVOIDANCE SYSTEM.

4,003,085. SELF-CLOCKING, ERROR CORRECTING LOW BANDWIDTH DIGITAL RECORDING SYSTEM.

4,003,090. MAGNETIC RECORDING AND REPRODUCING SYSTEM WITH TAPE-TO-HEAD SPEED CONTROL.

4,003,806. SILVER PLATING BATH.

4,003,844. LIQUID CRYSTAL DEVICES.

4,004,078. OPTICAL COMMUNICATION AND DISPLAY SYSTEM.

4,004,080. METAL COATING FOR VIDEO DISCS.

4,004,099. TIME DIVISION MULTIPLEX SWITCHING SYSTEM.

4,004,131. ARTICLE CARRYING CODED INDICIA.

4,004,133. CREDIT CARD CONTAINING ELECTRONIC CIRCUIT.

4,004,158. KEYED COMPARATOR.

4,004,195. HEAT-SINK ASSEMBLY FOR HIGH-POWER STUD-MOUNTED SEMICONDUCTOR DEVICE.

4,004,240. PHASE-SPLITTER CIRCUITS.

4,004,242. APPARATUS FOR SUPPLYING SYMMETRICALLY LIMITED BIDIRECTIONAL SIGNAL CURRENTS.

4,004,243. AMPLIFIER WITH CURRENT GAIN INVERSELY PROPORTIONAL TO TRANSISTOR H FE.

4,004,244. DYNAMIC CURRENT SUPPLY.

4,004,954. METHOD OF SELECTIVE GROWTH OF MICROCRYSTALLINE SILICON.

4,005,372. FREQUENCY TUNABLE MICROWAVE APPARATUS HAVING A VARIABLE IMPEDANCE HYBRID IDLER CIRCUIT.

4,005,436. APPARATUS FOR MAKING A RECORDING OF AN ELECTROSTATIC CHARGE PATTERN.

4,005,437. METHOD OF RECORDING INFORMATION IN WHICH THE ELECTRON BEAM SENSITIVE MATERIAL CONTAINS 4,4-BIS(3-DIAZO-3-4-OXO - 1 - NAPHTHALENE SULFONYLOXY) BENZIL.

4,005,451. LATERAL CURRENT DEVICE.

4,005,466. PLANAR VOLTAGE VARIABLE TUNING CAPACITORS.

4,005,474. RECORDING APPARATUS AND METHODS FOR A COLOR PICTURE/SOUND RECORD.

4,006,376. PHOTOTUBE HAVING IMPROVED ELECTRON COLLECTION EFFICIENCY.

4,006,381. CRT WITH THERMALLY-SET GETTER SPRING.

4,006,909. SEMICONDUCTOR WAFER CHUCK WITH BUILT-IN STANDOFF FOR CONTACTLESS PHOTOLITHOGRAPHY.

4,007,294. METHOD OF TREATING A LAYER OF SILICON DIOXIDE.

4,007,295. OLEFIN-SO2 COPOLYMER FILM ADHESION TO A SUBSTRATE.

4,007,297. METHOD OF TREATING SEMICONDUCTOR DEVICE TO IMPROVE ITS ELECTRICAL CHARACTERISTICS.

4,007,427. CASCADED TRANSISTOR AMPLIFIER STAGES.

4,007,583. ELECTRONIC TIMEPIECE.

4,007,881. COIL WINDING MACHINE.

4,008,370. AUTOMATIC NOISE GATE FOR A SYNCHRONIZING SIGNAL AMPLIFIER.

4,008,441. CURRENT AMPLIFIER.

4,008,445. ULTRA-VIOLET GAS LASER.

4,008,471. CORRELATOR TO REDUCE BIN STRADDLE IN A COLLISION AVOIDANCE SYSTEM.

4,008,475. STABILIZING AND CALIBRATION CIRCUIT FOR FM-CW RADAR RANGING SYSTEMS.

4,009,058. METHOD OF FABRICATING LARGE AREA, HIGH VOLTAGE PIN PHOTODIODE DEVICES.

4,009,426. VOLTAGE REGULATOR FOR A DEFLECTION SYSTEM.

4,009,432. CONSTANT CURRENT SUPPLY.

4,009,439. PROGRAMMING UNIT FOR A TELEVISION TUNING PHASE LOCKED LOOP.

4,009,473. CHARGE COUPLED MEMORY SYSTEM.

4,009,487. BLANKING GENERATOR FOR PAL SYNC SIGNALS.

4,009,489. NEGATIVE COLOR FILM MASK CORRECTION.

Dedications

3,326,265.—*Roy J. Paulin,* Cleveland Heights, Ohio. RADIANT HEATING MEANS. Patent dated June 20, 1967. Dedication filed Mar. 4, 1977, by the assignee, *Paulin Products Company.*

Hereby dedicates to the Public the remaining term of said patent.

3,605,132.—*John F. Lineback,* South Bend, Ind. AUTOMATIC PLUMBING VENT VALVE. Patent dated Sept. 20, 1971. Dedication filed Nov. 12, 1976, by the assignee, *Lyons Industries, Inc.*

Hereby dedicates to the Public the entire term of said patent.

3,930,348.—*Harry H. Wise,* Belle Mead, N.J. REINFORCED CONCRETE CONSTRUCTION. Patent dated Jan. 6, 1976. Dedication filed Dec. 28, 1976, by the assignee, *Johns-Manville Corporation.*

Hereby dedicates to the Public the entire remaining term of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 26, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-13-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	6-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	4-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution, Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-5-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-2-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-19-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	9-13-76

Expiration of patents: The patents within the range of numbers indicated below expire during April 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,931,038 to 2,934,765, inclusive
Plant Patents..... Numbers 1,926 to 1,948, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED MAY 3, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T958,001
METAL-COMPLEXED POLYMER

Bob G. Gower, Park Forrest, and Thomas J. Collachia, Chicago, both of Ill., assignors to Sinclair Oil Corporation, New York, N.Y.

Continuation of Ser. No. 499,714, Aug. 22, 1974, abandoned, which is a continuation of Ser. No. 390,974, Aug. 23, 1973, abandoned, which is a continuation of Ser. No. 786,409, Dec. 23, 1968, abandoned. This application Aug. 26, 1976, Ser. No. 718,304

Int. Cl.² C09G *1/04*

U.S. Cl. 106—10

No Drawing. 26 Pages Specification

A metal-complexed polymer prepared from ethylenically-unsaturated monomers, such as styrene, with a copolymer of styrene and maleic anhydride incorporated into the main polymer backbone to contribute carboxyl functionality, is disclosed. The resulting polymer is complexed with a metal such as zinc to achieve a crosslinked, highly insoluble film. These metal-complexed polymers may be employed in the preparation of metal-complexed, detergent-resistant coating compositions.

T958,002
MILK CARTON PAPERBOARD

Robert Eugene Cates, New Castle County, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 22, 1976, Ser. No. 734,843

Int. Cl.² D21F *11/00*

U.S. Cl. 162—135

No Drawing. 6 Pages Specification

Plastic coated sized paperboard, used in the manufacture of leak proof containers for liquids, is provided with a coating of a water-soluble calcium salt disposed between the sized paperboard and the plastic coating. In testing formed containers for defects in the plastic coating by means of a dye solution containing a wetting agent, the coated paperboard of this invention provides for a more positive determination of the nature and size of any defect indicated than heretofore since the calcium ion present in the coating imparts good resistance to excessive penetration and spreading of the dye solution.

T958,003
STAPLE SENSING APPARATUS

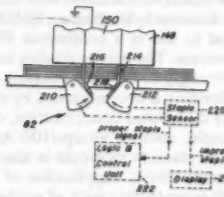
Matthew Jouette Russel, and John Frederick Hartman, both of 343 State St., Rochester, N.Y. 14650

Filed Mar. 30, 1976, Ser. No. 671,841

Int. Cl.² B27F *7/08*

U.S. Cl. 227—1

5 Sheets Drawing. 18 Pages Specification



In a finisher for finishing sets of copy sheets by stapling the sets into stapled booklets, staple sensing apparatus for sensing whether or not a staple has been properly driven, through the set of sheets. If a staple has been properly driven the legs of the staple effect an electrical continuity between staple clinchers. The electrical continuity is sensed and a first signal is produced indicative of a proper staple to permit continued operation of the finisher and electrographic apparatus to which it is attached. If an electrical discontinuity is sensed, a second signal is produced indicative of an improper staple and a display is actuated to indicate this condition to the operator.

T958,004
HOT-MELT ADHESIVE, AND WOOD COMPOSITE STRUCTURES PRODUCED THEREWITH

Grant Crane, and Edward Leo Kay, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 484,524, July 1, 1974, abandoned. This application Aug. 26, 1976, Ser. No. 717,842

Int. Cl.² C08J *11/00*; C08C *19/08*

U.S. Cl. 260—2.3

No Drawing. 25 Pages Specification

A hot-melt adhesive is shown which contains 75 to 99 parts by weight of depolymerized scrap rubber. From 1 to 25 parts by weight of an additive are included. The additive can include an elastomer, a resin, or a filler, or any combination thereof. The depolymerized scrap rubber is produced by heating solid scrap rubber in contact with a hydrocarbon liquid at 400° to 800° F. for 0.1 to 50 hours.

In use, the adhesive is heated and combined with two or more wood elements. When the combination cools, a composite wood structure is obtained.

T958,005
THERMOSETTING CELLULOSE ESTER POWDER COATING COMPOSITIONS

George O. Cash, Jr., 2220 Hermitage Drive, Kingsport, Tenn. 37664

Continuation of Ser. No. 610,344, Sept. 4, 1975, abandoned. This application Oct. 14, 1976, Ser. No. 732,278

Int. Cl.² C08L *1/14*

U.S. Cl. 260—15

No Drawing. 14 Pages Specification

A thermosetting powder coating composition comprises a low molecular weight cellulose acetate butyrate as the major component, an aminoplast crosslinking agent, an epoxide-blocked organic sulfonic acid catalyst, an epoxy resin and a plasticizer.

T958,006
METHOD FOR PROCESSING AMORPHOUS AND PARTIALLY CRYSTALLINE POLYMERS WITHOUT STICKING

Nicholas C. Russin, 312 McTeer Drive, Kingsport, Tenn. 37663; James H. Bond, 3429 Melrose Ave., and Ronald A. Tershansy, P.O. Box 3269, both of Kingsport, Tenn. 37664

Filed Nov. 24, 1975, Ser. No. 634,805

Int. Cl.² C08G *63/12*

U.S. Cl. 260—75 T

No Drawing. 5 Pages Specification

Method for treating pellets of a polyester polymer, such as a polyester polymer of poly(ethylene terephthalate), having at least some non-crystalline portions to prevent sticking when heated above the glass transition temperature. The method comprises mixing with pellets of the polyester polymer an amount of about 0.25% to about 5% by weight of crystalline fines which are less than 40 mesh in size, and preferably less than 140 mesh in size, of the same type polymer prior to or

while the pellets are being subjected to temperatures above the glass transition temperature. The crystalline fines may also be mixed with pellets of amorphous polyester polymer. Other examples of polymers with which this treatment will also be effective are poly(tetramethylene terephthalate); poly(1,4-cyclohexanedimethylene terephthalate); poly(1,4-cyclohexanedimethylene terephthalate) modified with isophthalic acid; and a copolymer of 3:1 terephthalic:adipic acids and 3:1 ethylene:tetramethylene glycols.

T958,007
PROCESS FOR SPINNING ACRYLIC FIBERS

Winston James Roberts, Waynesboro, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

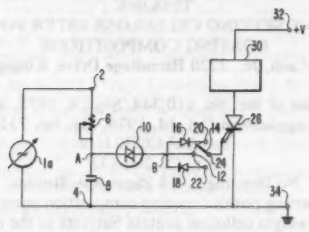
Filed June 17, 1976, Ser. No. 696,914
Int. Cl.² D01F *6/18*
U.S. Cl. 264—210 F
No Drawing. 23 Pages Specification

Fibers of a polymer containing at least 40% by weight of acrylonitrile units, at least 15% by weight of vinyl chloride units and at least 1% by weight of units of an ethylenically unsaturated sulfonate salt compound which have improved dye yield and luster stability are prepared by dry-spinning fibers of the polymer in an organic solvent and wash-drawing the fibers at a draw ratio of at least 2.2X in an aqueous bath maintained at an elevated temperature, thereby reducing the solvent content of the fiber to less than 3.5% by weight of the fiber. The wash-draw step may be carried out in one or more stages and preferably in at least two stages, the first of which involves a draw of 1.15–1.5X at 40°–60° C. Drying is preferably carried out by subjecting relatively wet fibers (80% moisture) to a high temperature (about 150° C).

T958,008
SWITCHING CIRCUIT

Cesare James Petrizio, Flanders, N.J., assignor to RCA Corporation

Filed June 23, 1976, Ser. No. 698,928
Int. Cl.² G05F *3/08*
U.S. Cl. 323—19
1 Sheets Drawing. 14 Pages Specification



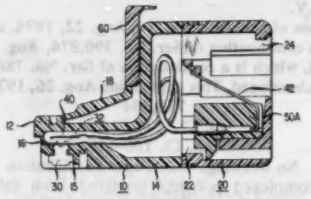
A gate-turn off silicon controlled rectifier (GTO) is operated by selectively applying to the gate electrode thereof one of: (a) pulses of a polarity to turn on the GTO, (b) pulses of opposite polarity to turn off the GTO, and (c) pulses of alternating polarity to successively turn the GTO on and off. The pulses are derived from a circuit which includes a capacitor, an AC source for charging the capacitor in opposite senses, a diac circuit responsive to a charge of greater than a given amplitude, in either sense, stored in the capacitor, and a switch circuit for selecting from among the pulses produced by the diac circuit one of *a*, *b* and *c*.

T958,009
ELECTRICAL ADAPTER

Dennis Rex Snyder, Indianapolis, Ind., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 16, 1976, Ser. No. 714,525
Int. Cl.² H01R *13/38*
U.S. Cl. 339—99 R
2 Sheets Drawing. 7 Pages Specification

An adapter in accordance with the present invention comprises a male member joined to a female member. The male member includes a plug portion having a plurality of spaced slots into which a plurality of blade contacts are respectively inserted, the blade contacts making electrical connection with conductors positioned within troughs that respectively communicate with the slots. Each conductor is doubled over within its associated trough, and both ends of each conductor are terminated with a wire spring contact. The contacts at one end of these conductors are mounted in a first contact carrier, while the contacts at the other end are mounted in a second contact carrier. In addition, a plurality of conductors, also terminated at both ends with wire spring contacts, extend directly between the carriers.



The contact carriers are respectively accommodated within a pair of internally communicating openings in the female member in such a manner that the wire spring contacts are exposed within a pair of externally communicating openings of the female member. Each externally communicating opening is adapted to accommodate a plug having contacts arranged so as to engage the contacts of the associated carrier and thereby be electrically connected to the blade contacts in the plug portion and to the contacts of the other carrier.

T958,010
PROTECTION OF OPTICAL FIBERS FROM STATIC FATIGUE

Bernard Raymond Eichenbaum, Lilburn; Raffaele Antonio Sabia, Atlanta, and Basant Kumar Tariyal, Stone Mountain, all of Ga., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

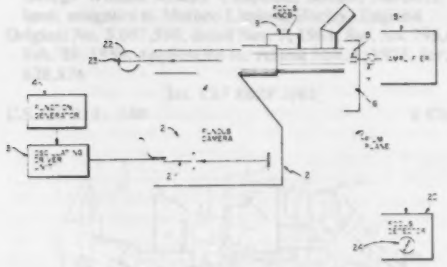
Filed May 26, 1976, Ser. No. 690,091
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96 WG
No Drawing. 10 Pages Specification

Communications grade glass optical fibers are protected from static fatigue failure by an initial coating that reacts with surface silanol groups, thereby to occupy or tie up water vapor reaction sites. The OH surface radicals may be bonded to by condensation reactions including: esterification, carboxylation, etherification, chlorination and ammination. For speed and simplicity of reaction, silanation with silanes is attractive as, for example, hexamethyldisilizane (HMDS). The reaction is sufficiently fast to use in a continuous fiber drawing and in-line coating process. The barrier coating may be selected to bond relatively strongly to an outer abrasion protection polymeric coating. Bonding is also enhanced by creating an initial minimum, evenly distributed concentration, of surface silanol groups, for example, about 5 groups/100 Angstrom units in any direction. The reaction molecule is also large enough to act as a water vapor barrier. Application of HMDS advantageously is by a fiber-contacting wick of urethane foam applied directly after fiber drawing, and followed by heating and application of the abrasion resistant polymer. The latter is ethylene vinyl acetate or other polymer that does not cause microbending losses in the fiber.

T958,011
OBJECTIVE FOCUSING METHOD AND APPARATUS FOR FUNDUS PHOTOGRAPHY

Ronald A. Laing, Lexington, Mass., assignor to The Trustees of Boston University, Boston, Mass.

Filed Apr. 14, 1976, Ser. No. 676,936
Int. Cl.² A61B *3/10*
U.S. Cl. 351—7
2 Sheets Drawing. 7 Pages Specification

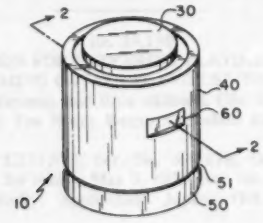


Apparatus and method for objectively focusing an instrument used for photographing the fundus of the eye such that consistent high resolution fundus photographs can be attained.
A narrow sharp oscillating needle 11 is focused onto the ocular fundus 22. The image 23 of the oscillating needle 11 moves past photodetector 15 located either at film plane 16 or at the plane of the crosshairs which are visible in the eyepiece or at any plane optically conjugate to the film plane. The spatial frequencies of image 23 are converted into a time-varying electrical signal at the output of photodetector 15. When image 23 of needle 11 is in best focus at film plane 16, its contrast is highest and the photodetector 15 will have a maximum alternating current output as indicated on focus detector 20.

T958,012
BATTERY

Jeffrey Richard Stoneham, 136 Frisbee Hill Road, Hilton, N.Y. 14468

Filed Oct. 26, 1976, Ser. No. 735,479
Int. Cl.² H01M *6/42*
U.S. Cl. 429—157
1 Sheets Drawing. 6 Pages Specification

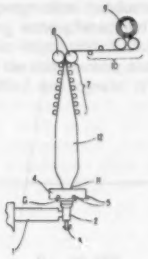


A battery formed of a plurality of disc-shaped cells of substantially the same voltage, connected in series and encased by an electrically nonconductive sheath to form a cylindrical unit having a positive terminal at one end and a negative terminal at the other end. The sheath contains an orientation groove for locating the battery in a predetermined orientation in a receiving compartment.

T958,013
POLYMERIC FILM

Denis George Harold Ballard; Eric Jones, and John Christopher Padget, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 8, 1976, Ser. No. 664,985
Claims priority, application United Kingdom, Mar. 7, 1975, 9562/75
Int. Cl.² B29C *17/02*; C08F *10/08*, *10/04*
U.S. Cl. 526—350
1 Sheets Drawing. 25 Pages Specification



A film formed from a copolyme of ethylene and at least one mono-α-olefine has a combination of impact strength and stiffness which is such that the function

$$\frac{\text{Impact strength (g)}}{\text{Film thickness (microns)}} \times [\text{Stiffness Modulus } (MNm^{-2}) - 100]$$

is at least **750.** The function is preferably at least **1000** and may be several thousands. The film may also have a high tear strength and good tensile strength.
The copolymer from which the film is formed is preferably one in which the comonomer contains at least 5 carbon atoms; the comonomer conveniently contains not more than 12 carbon atoms. The comonomer content of the polymer is typically in the range from 6.5 up to 30%, by weight.
The film can be produced by a tubular film technique using a temperature of 170°–300° C, a circumferential expansion of 1.2 to 10.0 times and a draw down of 2.5 to 50 times. The production of the polymeric film can include extruding the ethylene copolymer through an annular dye, maintaining the dye temperature in the range from 170°–300° C, blowing the exudate to give a circumferential expansion of from 1.2 up to 10.0 times and drawing the exudate to give a draw down of from 2.5 up to 50 times.

REISSUES

MAY 3, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

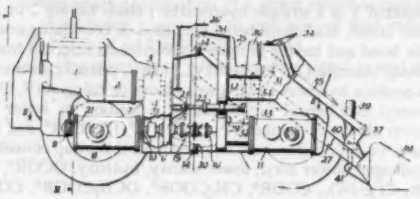
Re. 29,197
SHOVEL LOADERS

Leonard Stanley Mathew, Abinger Hammer, England, and George William Allister Chapman, Belfast, Northern Ireland, assignors to Matbro Limited, Horley, England

Original No. 3,007,590, dated Nov. 7, 1961, Ser. No. 795,625, Feb. 26, 1959. Application for reissue Nov. 5, 1975, Ser. No. 628,876

Int. Cl.² E02F *3/62*

U.S. Cl. 214—140 **6 Claims**



1. In a four wheel drive shovel loader in combination a forward frame, a forward driving axle rigidly connected to said forward frame, a rear frame pivotally connected to said forward frame about a vertical axis, a rear driving axle supporting said rear frame and pivotally connected to said rear frame about a horizontal longitudinal axis, said vertical pivot axis being substantially midway between the forward and rear axles, an engine supported on the rear frame, transmission means connecting said engine for drive with said forward and rear driving axles, steering means controlling the relative angle between the forward and rear axles about the vertical pivot axis, a pair of laterally spaced bucket support members pivotally connected to said forward frame, means for raising and lowering said spaced bucket support members, bucket means supported by said bucket support members and an operator's station positioned on said forward frame between said bucket support members and having means for controlling said steering means and means connected to said engine and transmission for controlling said engine and transmission.

Re. 29,198
PROCESS FOR PREPARING PLATINUM-TIN REFORMING CATALYST AND USE THEREOF

Takuji Itoh, Sayama, and Ikuo Akitsuki, Ohi, both of Japan, assignors to Toa Nenry Kogyo Kabushiki Kaisha, Tokyo, Japan

Original No. 5,131,975, Ser. No. 407,176, Oct. 17, 1973. Application for reissue May 3, 1976, Ser. No. 682,513

Claims priority, application Japan, Oct. 22, 1972, 47-105910

Int. Cl.² C10G *35/08*

U.S. Cl. 208—138 **9 Claims**

1. A process for preparing a hydrocarbon conversion catalyst comprising a complex compound of a platinum group metal component and a tin component contained on a refractory inorganic oxide carrier which comprises:

a. impregnating said refractory inorganic oxide carrier with an aqueous solution of a halogen acid containing a platinum group metal component;

b. drying the platinum group metal componentimpregnated carrier;

c. impregnating the dried platinum group metal component-impregnated carrier with a solution of a divalent tin compound, said impregnation conducted in a non-oxidizing and non-reducing atmosphere;

d. drying the carrier impregnated with said platinum group component and tin component; and

e. calcining the dried impregnate of step (d) at elevated temperatures.

9. A naphtha reforming process which comprises contacting a naphtha feed stock and hydrogen under reforming conditions with a catalyst comprising a complex compound of a platinum group metal component and a tin component contained on a refractory inorganic oxide carrier, said catalyst prepared by the method comprising:

a. impregnating said refractory inorganic oxide carrier with an aqueous solution of halogen acid containing a platinum group metal component;

b. drying the platinum group metal componentimpregnated carrier;

c. impregnating the dried platinum group metal component-impregnated carrier with a solution of a divalent tin compound, said impregnation conducted in a non-oxidizing and non-reducing atmosphere; and

d. drying the carrier impregnated with said platinum group component and tin component; and

e. calcining the dried impregnate of step (d) at elevated temperatures.

Re. 29,199
CERTAIN STEROID N-BIS-(HALOETHYL)-CARBAMATES

Hans Jakob Fex; Knut Bertil Högberg; Imre Könyves, and Paul Hans Otto Joseph Kneip, all of Hensingborg, Sweden, assignors to Aktiebolaget Leo, Helsingborg, Sweden

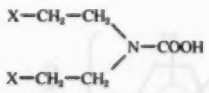
Original No. 3,299,104, dated Jan. 17, 1967, Ser. No. 356,666, Apr. 1, 1964. Application for reissue July 30, 1976, Ser. No. 708,921

Claims priority, application United Kingdom, Apr. 9, 1963, 14160/63

Int. Cl.² C07J *1/00*

U.S. Cl. 260—397.5 **17 Claims**

1. Mono- and polyesters of estrogenic steroid hormones selected from the group consisting of [estra-1,3,5(10)-triene-17β-ol,] estra-1,3,5(10)-triene-3,17β-diol, estra-1,3,5(10)-triene-3,17α-diol, [estra-1,3,5(10)-triene-3,17β-diol-16-one,] estra-1,3,5(10)-triene-3,16α,17β-triol, 17α-ethynyl-estra-1,3,5(10)-triene-3,17β-diol, [estra-1,3,5 (10)-triene-3,17β-diol-3-methyl-ether, and estra-1,3,5 (10)-triene-3,17β-diol-17-methylether,] with N-bis-(β-haloethyl)-carbamic acid of the formula:



(I)

wherein X is selected from the group consisting of chlorine and bromine, one or more remaining hydroxyl groups when present in the steroid nucleus being selected from the group consisting of free hydroxyl groups and hydroxyl groups esterified with an acid selected from the group consisting of aliphatic, cycloaliphatic and aromatic carboxylic acids, and inorganic polybasic acids.

Re. 29,200

PRODUCTION OF ALKOXY PHENOLIC COMPOUNDS

Allan B. McKague, Vancouver, and William deWaal, Sarnia, both of Canada, assignors to CPC International Inc., Englewood Cliffs, N.J.

Original No. 3,819,719, dated June 25, 1974, Ser. No. 251,132, May 8, 1972. Continuation-in-part of Ser. No. 233,795, March 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 124,449, March 15, 1971, abandoned. Application for reissue June 7, 1976, Ser. No. 693,303

Int. Cl.² C07C *41/00*

U.S. Cl. 260—613 D **4 Claims**

11. The process for the preparation of an o-alkoxyphenol selected from the group consisting of o-methoxyphenol and o-ethoxyphenol, comprising:

refluxing an alkoxycyclohexanone selected from the group consisting of 2-methoxycyclohexanone and 2-ethoxycyclohexanone substantially in the absence of a solvent for the alkoxycyclohexanone together with a Group VIII noble metal catalyst at a temperature of from about 150° C. to 250° C., and

recovering the alkoxyphenol.

Re. 29,201

PRODUCTION OF ALKOXY PHENOLIC COMPOUNDS

Allan B. McKague, Vancouver; William deWaal, Sarnia, and Carl E. Van Winckel, Vancouver, all of Canada, assignors to CPC International Inc., Englewood Cliffs, N.J.

Original No. 3,819,719, dated June 25, 1974, Ser. No. 251,132, May 8, 1972. Continuation-in-part of Ser. No. 233,795, March 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 124,449, March 15, 1971, abandoned. Application for reissue June 7, 1976, Ser. No. 693,304

Int. Cl.² C07C *41/00*

U.S. Cl. 260—613 D **10 Claims**

1. The process for the preparation of an o-alkoxyphenol in high yield and selectivity, comprising:

heating 2-chlorocyclohexanone and a lower alkyl monohydric alcohol under pressure to 110° C. to 200° C., and

contacting the resulting 2-alkoxycyclohexanone in the liquid phase with a Group VIII noble metal catalyst at a temperature of about 150° C. to 250° C.

Re. 29,202

SECONDARY PHOSPHORIC ACID ESTERS

Knut Bertil Hogberg; Hans Jacob Fex, both of Helsingborg; Bo Goran Fredholm, Nyhamnslage; Torsten Rune Perklev, and Sten Gunnar Veige, both of Helsingborg, all of Sweden, assignors to Aktiebolaget Leo, Helsingborg, Sweden

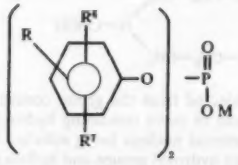
Original No. 3,897,519, dated July 29, 1975, Ser. No. 476,663, June 5, 1974. Division of Ser. No. 215,671, Jan. 5, 1972, Pat. No. 3,862,270. Application for reissue Aug. 4, 1976, Ser. No. 711,694

Claims priority, application United Kingdom, Aug. 17, 1971, 38619/71; Nov. 10, 1971, 52303/71

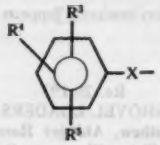
Int. Cl.² C07F *9/12*

U.S. Cl. 260—942 **34 Claims**

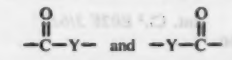
1. A symmetrical secondary phosphoric acid ester compound of the general formula



wherein R is positioned in m- or p-position relative to the phosphoric acid ester group and is



wherein X is selected from the group consisting of



wherein Y is a straight hydrocarbon chain having 2 or 3 carbon atoms, said chain being saturated or containing one double bond and having at most 2 substituents selected from the group consisting of lower alkyl, phenyl, phenyl substituted in p-position by lower alkyl, lower alkoxy or halogen (F, Cl, Br), benzyl and benzyl substituted in p-position by lower alkyl, lower alkoxy or halogen (F, Cl, Br); R^3, R^4, R^5, R^6, and R^7 are same or different and are selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, hydroxy, $OCOR^8$, F, Cl, Br, CF_3, NO_2, $COOR^9$, CH_2COOR^9, OCH_2COOR^9, $CONR_2^8$, $CH_2CONR_2^8$, $OCH_2CONR_2^8$, NR_2^8, NR^8COR^8, $CH_2NR_2^8$ and $CH_2NR^8COR^8$, wherein R^8 is selected from the group consisting of hydrogen and lower alkyl, and wherein R^9 is selected from the group consisting of hydrogen, lower alkyl and M, where M is selected from the group consisting of H, Na, K, ½ Ca and a pharmaceutically acceptable amine with the proviso that one of said substitutents R^3-R^7 is selected from the group consisting of $COOR^9$, CH_2COOR^9, OCH_2COOR^9, $CONR_2^8$, $CH_2CONR_2^8$ and $OCH_2CONR_2^8$, or selected from the group consisting of NR_2^8, NR^8COR^8, $CH_2NR_2^8$, and $CH_2NR^8COR^8$, wherein R^8 and R^9 have the above meaning.

Re. 29,203

METHOD OF MAKING PHOSPHOR SCREENS

Phyllis Brown Branin, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Original No. 3,313,643, dated Apr. 11, 1967, Ser. No. 559,124, June 21, 1966. Continuation-in-part of Ser. No. 190,771, April 27, 1962, abandoned. Application for reissue Aug. 23, 1976, Ser. No. 716,533

Int. Cl.² B05D *5/06*, *5/12*

U.S. Cl. 427—68 **10 Claims**

1. The method of making a plurality of phosphor screens comprising the steps of:

(a) applying a portion of initial slurry onto a first substrate, said initial slurry including phosphor particles predominantly in the size range of 1 to 20 microns with a minor weight proportion of said particles greater than 10 microns in size, said portion of initial slurry being more than that required to provide a coating of desired thickness on said first substrate.

(b) spreading said portion of initial slurry over said first substrate to said desired thickness,

(c) removing from said first substrate the fraction of said portion of initial slurry which is in excess of that required to provide said coating of said desired thickness,

(d) mixing said removed fraction with makeup slurry to produce a reconstituted slurry, said makeup slurry containing phosphor particles predominantly in the size range of 1 to 20 microns with a larger weight proportion of particles greater than 10 microns in size than the minor weight proportion in said initial slurry,

(e) and then dispensing a portion of said reconstituted slurry onto a second substrate.

Re. 29,204

CONTROLLED HIGH VOLTAGE LIGHTING SYSTEM FOR GASEOUS-DISCHARGE LAMPS

Carl R. Snyder, Alief, Tex., assignor to Esquire, Inc., New York, N.Y.

Original No. 3,681,653, dated Aug. 1, 1972, Ser. No. 26,615, Apr. 8, 1970. Application for reissue June 24, 1976, Ser. No. 699,376

Int. Cl.² H05B 41/23

U.S. Cl. 315—106 16 Claims

1. A gaseous-discharge lamp lighting system comprising:

a gaseous-discharge lamp;

ballast means including an inductive portion operatively connected to said lamp;

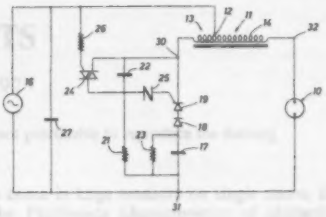
a voltage source connected to said ballast means;

pulsing means for inducing pulses in the inductive portion of said ballast means to ignite said lamp including:

a first series combination of a gated switch means and a capacitance connected to one end of said inductive portion of said ballast means; and

charging means for applying a gating signal to said switch means at a predetermined time at least once every cycle to render said switch means conductive;

control means for inductively sensing current flow through



the inductive portion when said lamp is ignited including gated bilateral switch means which is triggered by voltage inducted in said winding to conduct during operation of said lamp and render said pulsing means inoperative.

PLANT PATENTS

GRANTED MAY 3, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,046

ROSE PLANT NAMED PARFAIT

Clysten Knight, Richmond, Ind., assignor to DeVor Nurseries, Inc., Pleasanton, Calif.

Filed Mar. 29, 1976, Ser. No. 671,667

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—22 **1 Claim**

1. A new and distinct variety of rose plant substantially as herein shown and described, characterized by the distinctive red, ivory and yellow coloration of its blooms in which a basic suffusion of red spreads progressively from the petal margin to near the base as the bloom develops from bud opening to full maturity.

4,047

ROSE PLANT

O. L. Weeks, 926 W. Philadelphia, Ontario, Calif. 91761

Filed June 7, 1976, Ser. No. 693,737

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—24 **1 Claim**

1. A new and distinct variety of Rose plant of the Floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the well formed buds which come in large measure on single stems, the buds retaining the Floribunda characteristics of clustering adequately to provide color mass, the excellent petal substance which provides long life to the flower, both on the plant and when cut, the vivid yellow coloring which holds well throughout the life of the flowers, and the well contained growth and upright development with little spreading effect.

4,048

ROSE PLANT

O. L. Weeks, 926 W. Philadelphia, Ontario, Calif. 91761

Filed June 7, 1976, Ser. No. 693,791

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—3 **1 Claim**

1. A new and distinct variety of rose plant of the climbing class, substantially as herein shown and described, characterized particularly as to novelty by the long, extremely strong and vigorous canes which attain an average mature height of six to eight feet, the habit of bearing its flowers on stems which grow as laterals from the climbing canes, and the long life of the flowers both on the plant and when cut.

PLANT PATENTS

GRANTED MAY 3, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,016

ROSE PLANT NAMED PARFAIT

Clyrtee Knight, Richmond, Ind., assignor to Jackson Nurseries, Inc., Plaquemine, Calif.

Filed Mar. 29, 1976, Ser. No. 671,467

Int. Cl.[2] A01H 3/00

U.S. Cl. PP.—22 1 Claim

1. A new and distinct variety of rose plant substantially as herein shown and described, characterized by the distinctive red, ivory and yellow coloration of its blooms in which a basic suffusion of red accrues progressively from the petal margin to near the base as the bloom develops from bud opening to full maturity.

4,047

ROSE PLANT

O. L. Weeks, 928 W. Philadelphia, Ontario, Calif. 91761

Filed June 7, 1976, Ser. No. 693,727

Int. Cl.[2] A01H 3/00

U.S. Cl. PP.—24 1 Claim

1. A new and distinct variety of rose plant of the Floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the well formed

4,016

ROSE PLANT NAMED PARFAIT

Clyrtee Knight, Richmond, Ind., assignor to Jackson Nurseries, Inc., Plaquemine, Calif.

Filed Mar. 29, 1976, Ser. No. 671,467

Int. Cl.[2] A01H 3/00

U.S. Cl. PP.—22 1 Claim

1. A new and distinct variety of rose plant substantially as herein shown and described, characterized by the distinctive red, ivory and yellow coloration of its blooms in which a basic suffusion of red accrues progressively from the petal margin to near the base as the bloom develops from bud opening to full maturity.

4,047

ROSE PLANT

O. L. Weeks, 928 W. Philadelphia, Ontario, Calif. 91761

Filed June 7, 1976, Ser. No. 693,727

Int. Cl.[2] A01H 3/00

U.S. Cl. PP.—24 1 Claim

1. A new and distinct variety of rose plant of the Floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the well formed

bush which comes in large masses on single canes, the bush retaining the Floribunda characteristics of clustering adequately to provide even cover, the excellent petal substance which provides long life to the flower, both on the plant and when cut, the vivid yellow coloring which holds well throughout the life of the flowers, and the well contained growth and upright development with little spreading effect.

PATENTS

GRANTED MAY 3, 1977

ERRATA

For CLASS	See PATENT NO.
053–234	4,020,608
226–020	4,021,031
272–123	4,021,040
417–390	4,021,164
029–157.3 R	4,021,204
062–180	4,021,213
062–244	4,021,214
062–402	4,021,215
134–063	4,021,266
358–297	4,021,605
358–130	4,021,606
358–230	4,021,607
361–011	4,021,699
361–028	4,021,700
361–018	4,021,701
361–103	4,021,702
361–085	4,021,703
361–077	4,021,704
361–402	4,021,705
361–210	4,021,706
361–284	4,021,707
361–295	4,021,708
361–229	4,021,709
250–574	4,021,713
357–031	4,021,843

PATENTS

GRANTED MAY 3, 1977

ERRATA

CLASS	PATENT NO.
051-234	4,020,608
220-020	4,021,011
222-122	4,021,040
417-290	4,021,194
029-157.3 R	4,021,208
062-180	4,021,213
062-264	4,021,214
062-402	4,021,215
174-063	4,021,266
338-277	4,021,805
338-130	4,021,806
338-230	4,021,807
361-013	4,021,809
361-028	4,021,750
361-038	4,021,701
361-107	4,021,702
361-062	4,021,703
361-277	4,021,704
361-402	4,021,705
361-210	4,021,706
361-234	4,021,707
361-233	4,021,708
361-229	4,021,709
150-574	4,021,713
357-021	4,021,843

PATENTS

GRANTED MAY 3, 1977

GENERAL AND MECHANICAL

4,020,507

INTER-LINER FOR A SAFETY HELMET

William G. Morton, P.O. Box 841, Hopewell, Va. 23860

Division of Ser. No. 570,712, April 23, 1975, Pat. No. 3,992,721, which is a continuation-in-part of Ser. No. 360,950, May 16, 1973, Pat. No. 3,882,546, which is a continuation-in-part of Ser. No. 323,195, Jan. 12, 1973, abandoned. This application Oct. 29, 1975, Ser. No. 626,628

Int. Cl.[2] A42B *1/03, 3/00;* **F41H** *1/04*

U.S. Cl. 2—411 **7 Claims**

1. In a safety helmet assembly including a dome-shaped outer helmet shell of substantially rigid material, an improved inter-liner comprising a generally rigid dome-shaped inner shell of generally uniform thickness, a deformable cap-like headpiece of generally uniform thickness and positioned within said inner shell to define a dome-shaped cavity between said headpiece and said inner shell, said headpiece being effective to contact the wearer's head and to conform to the contour of the wearer's head over the entire area covered by said headpiece, means for securing a lower edge portion of said headpiece to the corresponding lower edge portion of said inner shell and for maintaining the upper portion of said headpiece spaced below the overlying upper portion of said inner shell, said inner shell, said headpiece and said securing means forming a subassembly, and means for retaining said subassembly within said outer helmet shell.

4,020,508

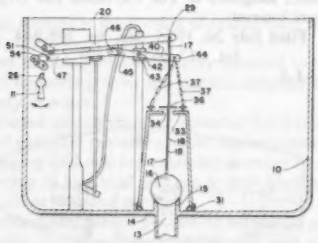
ALTERNATE TOILET BOWL FLUSH APPARATUS

Leo J. Morgan, Farmingdale, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 14, 1975, Ser. No. 622,364

Int. Cl.[2] E03D *1/34, 5/02;* **A61B** *19/00*

U.S. Cl. 4—67 A **3 Claims**



1. A toilet bowl tank designed to alternately discharge the full or a partial amount of water in the tank, said tank fitted with a discharge outlet in the bottom wall of the tank and fitted with a ball-cock valve that rests, in a first position, on the rim of the discharge outlet of the tank, said tank fitted with a sleeve that rests, in a first position, on the bottom wall of the tank in vertical orientation about the ball-cock valve and discharge outlet,

with first lifting means linked to a handle mounted on an external wall of the tank so as to lift the ball-cock valve to a second position, said second position of the ball-cock valve being above the discharge outlet so that the ball-cock valve is clear of engagement with the rim of the discharge outlet, and with

a second lifting means linked to said handle so as to lift the sleeve to a second position,

said second position of the sleeve being clear of engagement with the tank bottom wall surounding the discharge unit,

said first and second lifting means being independently linked by means to the handle such that manual operation of the handle alternately actuates only one of the said lifting means in response to a given direction of movement of said handle, with said first lifting means fastened to the ball-cock valve by a flexible tension member that passes freely through a hole in a member fixed to the top of the sleeve, and with a projection fastened to the tension member above the sleeve, said projection of a larger size than the said hole so that lifting of the sleeve by the second lifting means serves to also lift the said projection and the attached ball-cock valve.

4,020,509

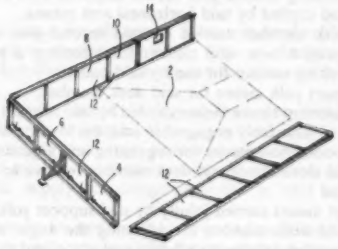
COMBINATION WOOD AND ALUMINUM SWIMMING POOL WALL STRUCTURE

Robert E. West, Yardley, Pa., assignor to Cascade Industries, Incorporated, Edison, N.J.

Filed Aug. 14, 1975, Ser. No. 604,745

Int. Cl.[2] E04H *3/16, 3/18;* **F16L** *22/02*

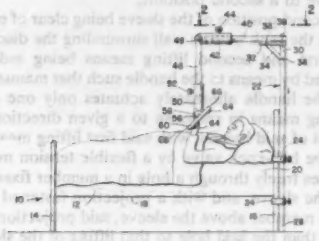
U.S. Cl. 4—172.19 **5 Claims**



1. A swimming pool comprising a plurality of panels joined together at their ends to form the side walls of a swimming pool, each of said panels including upper and lower horizontal receptors extending throughout the length of the panels and formed with oppositely facing channels, a plurality of sheets of plywood embodied in each panel and having the upper and lower edges thereof located in the channels of said receptors and abutting the inner side of said channel so as to be held against inward displacement thereof, a longitudinally extending rib in each channel spaced from the side of the channel engaged by the plywood sheets, means between said rib and panel for holding said panels in engagement with said inner side of the channel, fastening means passing through said side of each channel and through said plywood sheets and into said ribs to secure the plywood sheets to the receptors, vertically extending stiffening means secured at their upper and lower ends to said horizontal receptors and formed with oppositely facing grooves therein in which the vertical edges of adjacent plywood sheets are located, said stiffening members having notches in the upper and lower ends thereof in which the

longitudinally extending ribs of said receptors are received to position and strengthen the vertical edges of said sheets of plywood.

4,020,510
HOSPITAL BED READING AND WRITING DEVICE
Ralf Fabian, 634 Cedar St., Mamaroneck, N.Y. 10543
Continuation of Ser. No. 473,353, May 28, 1974, abandoned.
This application Sept. 2, 1975, Ser. No. 609,553
Int. Cl.² A47B *83/04*; A47C *21/00*
U.S. Cl. 5—332 **5 Claims**



1. A bed accessory device for use with a bed on a horizontal support surface when occupied by a pateint and the like, comprising:

upright main post means,

main fastening means for fastening said main post means to a rear frame portion of said bed with the lower end of said upright main post means in engagement with said horizontal support surface,

horizontal arm means carried by said main post means and extensible therefrom,

said horizontal arm means being elevationally disposed above the patient,

depending second post means disposed above the patient and carried by said horizontal arm means,

a desk member carried by said second post means to a location near said patient for affording a reading and writing surface for use by said patient,

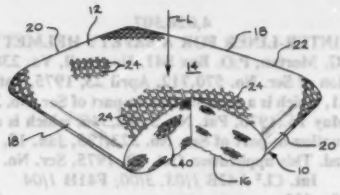
support yolk means for said desk member,

adjustment sleeve means carried by said support yolk means and adjustably engageable with the lower portion of said second post means for regulating and adjusting the vertical elevation of said desk member relative to the patient, and

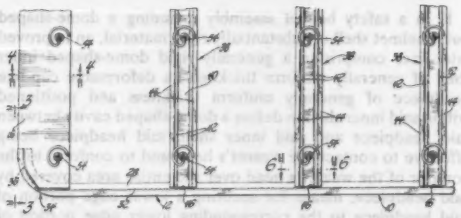
pivot means carried jointly by said support yolk means and said desk member for adjusting the angle of said desk member relative to a horizontal plane and to the patient for convenient positioning for the patient to employ said desk member for reading and writing thereon.

4,020,511
FOAM BED PILLOW
Samuel M. Terry, Ann Arbor, Mich., assignor to Hoover Ball and Bearing Company, Saline, Mich.
Filed May 28, 1975, Ser. No. 581,495
Int. Cl.² A47G *9/08*
U.S. Cl. 5—337 **2 Claims**

1. A one-piece bed pillow comprising a pillow shaped molded body of open cell urethane foam material having a continuous outer surface, said body being adapted to be placed in a generally horizontal load supporting position in which it has a top load supporting surface, ends and sides, said outer surface being formed with a regular pattern of shallow surface depressions, substantially all of said depressions being interconnected to thereby impart surface softness to said body member, said body member having a plurality of internal interconnected elongated open cells extending in generally the same direction as said load supporting surface to thereby provide said body with desirable load-deflection characteristics wherein said pillow has a soft resistance to initial load and has increased resistance to larger loads.

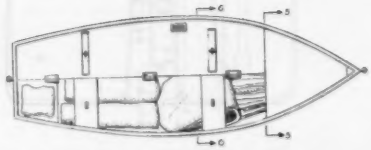


4,020,512
BED ASSEMBLY
William L. Pringle, Grosse Pointe Shores, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.
Filed Sept. 5, 1975, Ser. No. 610,669
Int. Cl.² A47C *23/02*
U.S. Cl. 5—264 R **5 Claims**



1. A bed assembly comprising: metal frame means of generally rectangular configuration including a pair of opposed side rails and a pair of opposed end rails, a plurality of metal slats extending transversely between said side rails in spaced parallel relationship to one another and to said end rails, a plurality of spring retainer means disposed in said slats and in said end rails, each of said spring retainer means including an aperture with tabs extending thereinto for engaging and gripping a spring inserted into said aperture, each of said apertures being disposed in a concavity for guiding a spring into each of said apertures.

4,020,513
COMBINATION LUGGAGE CARRIER AND PICNIC TABLE FOR USE WITH ROWBOATS
McCoy Warren, and Alfreda C. Warren, both of San Francisco, Calif., assignors to The Raymond Lee Organization, Inc., a part interest
Filed July 26, 1976, Ser. No. 708,844
Int. Cl.² B63B *17/00*
U.S. Cl. 9—1.5 **3 Claims**



1. A device for use with rowboats and the like which have seats into which holes have been placed, comprising:

two flat, horizontally elongated panels, each having a plurality of holes which panels are mirror images of each other and which panels have three straight edges and one out-

wardly curved edge, the panels being so shaped that when they are placed side by side next to each other inside a rowboat on top of the seats a flat surface will be formed which completely covers the major portion of the open top of the boat, said surface having a straight forward edge that extends transversely across the boat, with the line separating the two panels lying above the central longitudinal axis of the boat, and with the holes in the panels being aligned with the holes in the seats;

a plurality of first hinges hingedly connecting the panels together so as to enable one panel to be folded on top of the other, the first hinges being located on the tops of the panels;

two like sets of like straight elongated legs, each leg having a hole approximately midway between its ends;

two like sets of like second hinges, set of second hinges connecting a corresponding set of legs to a corresponding panel, with each second hinge securing the outer end of a corresponding leg to the panel in a manner that the leg normally extends transversely across the panel with the hole in the leg being aligned with a corresponding hole in the panel and that the leg can be pivoted about its outer end to a vertical position perpendicular to the plane of the panel;

brace means cooperating with the legs and panels to brace the legs in vertical positions once the legs have been pivoted thereto; and

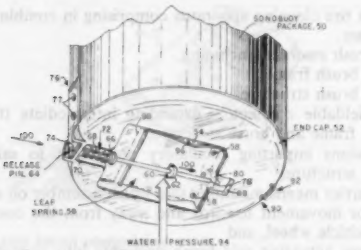
lock means removably locatable in the holes in the legs, panels and seats to detachable secure the legs, panels and seats together.

4,020,514

BOTTOM RELEASE MECHANISM FOR A SONOBUOY

Armand E. Bourgeois, Manchester, N.H., assignor to Sanders Associates, Inc., South Nashua, N.H.

Filed Dec. 12, 1975, Ser. No. 640,115
Int. Cl.² B63B *21/52*
U.S. Cl. 9—8 R **15 Claims**



1. Apparatus adapted to impact a body of water comprising:

a housing having a portion adapted to impact said body of water;

an end cap located at the portion of said housing adapted to impact said body of water;

an end cap retaining member fixedly attached to said housing and depending from the portion adapted to impact said body of water;

a spring biased release member mounted for translation on said end cap; said release member in one position operably engaging said end cap retaining member in a locking relationship to lock said end cap to said housing;

an abutment at said end cap; and,

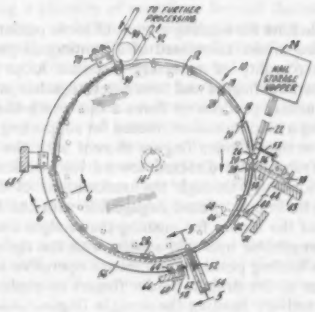
a deformable detent meber positioned between a portion of said spring biased release member and said abutment, said deformable detent member exerting a force on said spring biased release member in a direction opposite to the direction of spring biasing to maintain said locking relationship in one position and to unlock said spring biased release member upon deformation, whereby when said end cap impacts said body of water said deformable detent member moves out from between said portion of said spring biased release member and said abutment, thereby to release said spring biased release member from locking engagement with said end cap retaining member to release said end cap.

4,020,515

APPARATUS FOR ASSEMBLING WASHER-SHAPED AND ELONGATED COMPONENTS AND THE LIKE

Paul Goerke, 14126 Dearborn, Riverdale, Ill. 60627, and Waldemar S. Dyhringer, 257 E. 143rd St., Dolton, Ill. 60419

Filed Dec. 1, 1975, Ser. No. 636,686
Int. Cl.² B23P *19/08*
U.S. Cl. 10—155 A **8 Claims**



1. An apparatus for placing at least one washer-shaped component on an elongated object to form an elongated object and washer-shaped component combination which comprises:

moveable carrier means having at least one elongated groove therein and at least one receptical aligned with said groove for receiving a washer-shaped component;

object inlet means located adjacent to said moveable carrier means to supply an elongated object to said carrier means;

magnetic means located on said carrier and positioned with respect to said groove, said means exerting magnetic forces so that as said carrier means moves, said magnetic forces attract and hold said elongated object from said object inlet means at least partially within said groove;

inlet means located adjacent to said moveable carrier means to supply a washer-shaped component to said receptacles of said carrier means so that the hole of said washer-shaped component is positioned in said receptacle in substantial alignment with the axis of said elongated object which is attracted to and held in said groove by said magnetic means on said carrier;

assembly means located in proximity to said carrier means so that, as said carrier means moves, said assembly means comes in contact with said elongated object held by said magnetic means to urge said elongated object through the hole of said washer-shaped component in said receptacle to form said elongated object and washer-shaped component combination; and

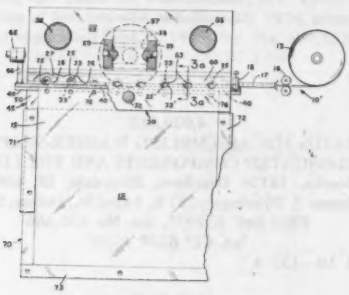
exit means located in proximity to said carrier means to remove and recover said elongated object and washer-shaped component combination from said carrier means as said carrier means moves.

4,020,516

APPARATUS FOR BINDING LOOSE SHEETS

Albert Gomez, Whitestone, N.Y., assignor to Spiral Binding Company, Inc., New York, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,735
Int. Cl.² B42C *19/00*
U.S. Cl. 11—1 A **24 Claims**



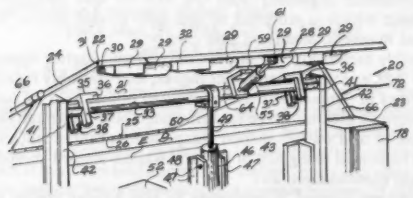
1. A machine for binding a book of loose perforated sheets with a wire binder composed of a continuous piece of wire having a plurality of reversely disposed loops formed as straight parallel fingers and connected together at their roots by longitudinal portions to form a flat comb-like structure, comprising a binding station, means for supporting a binder so that the straight binder fingers thereof with the tips of the fingers foremost are directed toward said station in proper position for entry through the perforations of the book of sheets to be bound, means engageable with the longitudinal portions of the binder for pushing the straight binder fingers thereof lengthwise into said station with the tip ends of said fingers in leading position, and means operative at said binding station as the straight binder fingers ae pushed thereinto for progressively bending the straight fingers under the pressure of said pushing means into circular form starting with the tip ends thereof so that the bent finger portions progressively pass into and through the perforations of the book of sheets, said supporting means including restraining means for each straight binder finger operative to prevent the portions thereof between said pushing means and said operative means becoming bent during the pushing action of said pushing means and until such portions reach said operative means, and said pushing means maintaining an advancing force on the binder fingers only until the tip ends thereof become situated in the gaps at the roots of the fingers between the longitudinal portions of the binder.

4,020,517

DOCKBOARD

Robert E. Waddell, P.O. Box 4174, Charlotte, N.C. 28204

Filed Feb. 26, 1976, Ser. No. 661,526
Int. Cl.² E01D *1/00*
U.S. Cl. 14—71.5 **19 Claims**



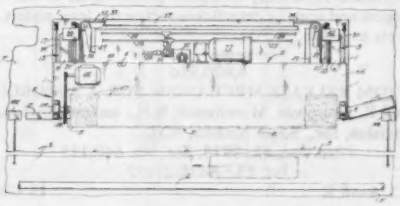
12. A dockboard for use on a loading dock to provide a ramp between the dock and the platform of an adjacent vehicle, said dockboard comprising a dock plate having an outer edge disposed generally along the edge of the dock and an inner edge spaced from the dock edge, said dock plate being movable between a generally flat disposition at the level of said dock and an inclined disposition at which the outer edge is raised to a vehicle loading or unloading level and the inner edge is at the dock level, means for supporting said dock plate during movement thereof including a cross bar extending transversely under said dock plate adjacent said outer thereof, and at least one pair of downwardly projecting arms secured to the underside of said dock plate and straddling said cross bar for support of said dock plate on said cross bar while allowing relative movement to accommodate slight vertical or tilting movement of said dock plate to conform with the bed of an adjacent vehicle during unloading or loading and to permit removal of said dock plate from said cross bar.

4,020,518

AUTO TIRE CLEANING APPARATUS

Maurice R. Harding, 8540 SW. Spruce St., Portland, Oreg. 97223, and David D. Teeney, 14334 NE. Sandy Blvd., Portland, Oreg. 97230

Filed June 7, 1976, Ser. No. 693,644
Int. Cl.² B60S *3/04*
U.S. Cl. 15—53 B **21 Claims**



1. A tire cleaning apparatus comprising in combination,
a base,
a brush assembly including,
a brush frame,
a brush structure,
yieldable connectors extending intermediate the brush frame and brush structure,
means imparting oscillatory movement to said brush structure,
a carrier means mounting said brush assembly on said base for movement towards and away from the course of a vehicle wheel, and
means actuating said brush assembly into contact with a vehicle wheel.

4,020,519

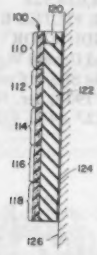
STATIONARY BACK SCRUBBER

Wayne B. Robison, Antioch, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Dec. 23, 1975, Ser. No. 643,694
Int. Cl.² A47K *7/03*
U.S. Cl. 15—104.92 **7 Claims**

1. A body scrubbing apparatus for attachment to a wall comprising a an absorbent resilient scrubbing means, said abosrbent scrubbing means having liquid detergent reservoir means mounted at the top thereof for gravity feeding liquid detergent downwardly through said absorbent scrubbing means, the density of said absorbent scrubbing means increasing in a direction from said detergent reservoir means towards the bottom of said absorbent scrubbing means to minimize the pooling of liquid detergent at the bottom of said absorbent scrubbing means, wall securing means operativey connected to the back of said absorbent means for attachment to a wall surface, said absorbent scrubbing means is mounted on back-

ing means, the upper portion of said backing means having recess means therein, the upper portion of said absorbent scrubbing means extending across said recess to thereby form



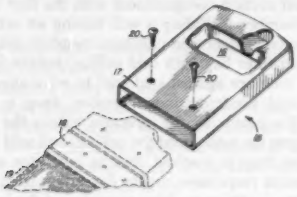
said reservoir for a liquid detergent, said backing means having said wall securing means on the face thereof opposite said absorbent scrubbing means.

4,020,520

HANDLE FOR PAINT BRUSHES AND THE LIKE

Nick Dellas, 8613 E. Valley Vista Drive, Scottsdale, Ariz. 85253

Filed Sept. 15, 1975, Ser. No. 613,285
Int. Cl.² A46B 5/02
U.S. Cl. 15—176 **1 Claim**



1. A paint brush comprising:

an elongated hollow handle member engaging at one end a brush and at the other end engageable by the hand of a user,

said other end being provided with a first opening extending therethrough large enough to receive the first four fingers and palm and back of the hand with the fingers capable of extending longitudinally of said member toward said other end of said handle member and the palm and back of the hand engaging the periphery of said first opening,

said first opening being of a substantially rectangular configuration extending laterally across the longitudinal axis of said handle member,

gripping means arranged at said other end of said member for grasping a brush comprising a second opening extending longitudinally into said one end of said handle member, whereby said handle member is arranged to fit over the handle end of a brush,

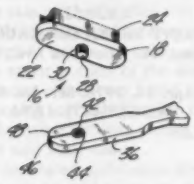
means extending through said one end of said handle member to fasten said brush to the handle member, said handle member being substantially ten inches in length and four inches in width and said first opening being approximately two and three quarters inches wide in a direction extending along the length of said handle member.

4,020,521

TOOTHBRUSH

Robert L. Velasquez, 11422 Minden, Detroit, Mich. 48025

Filed Apr. 11, 1975, Ser. No. 567,315
Int. Cl.² A46B 9/04
U.S. Cl. 15—172 **2 Claims**



1. A toothbrush, comprising:

a. a first member comprising:
   1. a support having opposite first and second surfaces,
   2. a projection depending from the second surface and having a plurality of serrations formed therearound,

b. a plurality of bristles projecting outwardly from and substantially perpendicular to the first surface of the first member, the bristles being configured in the shape of a V,

c. an elongate second member having an aperture formed therethrough proximate a first end thereof, the aperture having a plurality of serrations formed therearound, the serrations being complementarily configured to the projection, the aperture receiving the projection to retain the first member, the second member having a slit in a plane perpendicular to said second member and extending from the first end to the aperture,

wherein the complementary serrations define means for incrementally rotating the first member about the vertical axis of the second member, the projection having a height equal to the depth of the aperture such that the terminus of the projections is coplanar with the surface of the second member,

d. said serations of said projection and said serations of said aperture having edges that are straight and parallel with respect to each other for the entire length of the projection and the full depth of the aperture, and

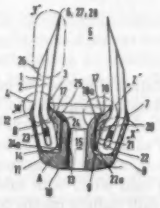
e. the projection having a diameter slightly larger that that of the aperture.

4,020,522

BRISTLE RING FOR USE IN DENTAL CARE

Hans Behrend, Osloer Strasse 99.1, Berlin 65, Germany

Filed Dec. 18, 1975, Ser. No. 641,920
Claims priority, application Germany, Dec. 21, 1974, 2461055
Int. Cl.² A46B 7/08
U.S. Cl. 15—180 **9 Claims**



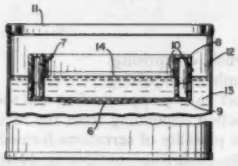
1. A bristle ring for use in dental care comprising a plurality of bristles arranged in ring shape in a depth of at least two rows of bristles, a rotating cup, the bristles being mounted with their base in said rotating cup and, starting from their mounting in said cup, being slanted conically inwardly in an

upwards diminishing cross-section, and the forward portions of the outer bristles of said ring having a frusto-conical shape of upwardly diminishing section and the innermost bristle extending beyond the outwardly adjoining row of bristles so as to protrude beyond said frusto-conical shape and to form an outer circular sharp edge (6).

4,020,523
PAINT BRUSH DIP GAUGE

Theodore G. Brown, 4401 Lantana Ave., Sacramento, Calif. 95824

Filed Apr. 14, 1976, Ser. No. 676,907
Int. Cl.² A47L *13/56*
U.S. Cl. 15—257.05 **6 Claims**

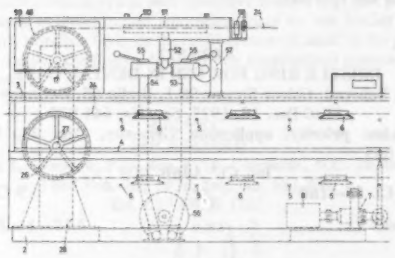


1. A paint brush dip gauge comprising a porous plate, a buoyant member attached to and rising from the margin of said plate for supporting the plate at a desired depth below the surface of a body of paint, a paint brush wiping ring, and means demountably supporting said ring on said buoyant member and at a predetermined level thereabove.

4,020,524
COOLING INSTALLATION FOR USE IN PRODUCING INSULATED METAL WIRE

Michel Compagnon, La Tour-de-Peilz, Switzerland, assignor to Maillefer S.A., Switzerland

Filed Mar. 5, 1976, Ser. No. 664,419
Claims priority, application Switzerland, Mar. 14, 1975, 3303/75
Int. Cl.² B08B *3/04, 5/02*
U.S. Cl. 15—302 **8 Claims**

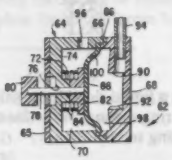


1. A cooling installation for use in producing insulated metal wire, said installation comprising a vat and means for guiding said wire longitudinally within said vat and for ejecting a cooling fluid against said wire, further comprising a motor situated outside said vat, means for accumulating said wire, and means for pulling said wire, both said means being disposed within said vat, said pulling means comprising a pulley, and said accumulating means comprising two or more shafts and two or more pulleys having parallel axes, said pulleys being borne by said shafts, one said shaft being included in said pulling means and being rotatingly driven by said motor, and said pulley of said pulling means being rigidly secured to said one shaft, said accumulating means and said pulling means being adapted to cause said wire to travel several times over a cooling path between said shafts.

4,020,525
VACUUM CLEANER FILTER BAG CONDITION INDICATOR

Charles T. Fromknecht, and Donald W. Carnes, both of Anderson, S.C., assignors to The Singer Company, New York, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,277
Int. Cl.² A47L *9/00*
U.S. Cl. 15—339 **7 Claims**



1. In a vacuum cleaner having a housing including a suction compartment, an air permeable filter bag mounted in said compartment, means defining an air inlet in said housing communicating with said filter bag, means defining an outlet in said housing, an air-moving unit in flow communication with said compartment and said outlet for drawing dirt-laden air through said inlet and discharging filtered air through the outlet, the improvement comprising: indicator means for detecting a pressure drop of predetermined amount through said filter bag thereby to indicate that the filter bag is substantially full of dirt, said indicator means comprising a casing mounted in the housing, pressure responsive means including a movable partition member mounted in said casing and separating said casing into first and second chambers, means communicating said suction compartment with the first chamber, said second chamber including a wall having an orifice, said orifice being smaller than said partition member, means communicating said filter bag with said orifice, means for urging said partition member against said wall to normally seal said orifice until said predetermined pressure drop is reached, bleed means for balancing the pressure across the partition member adjacent the wall about the orifice until said predetermined pressure drop is reached, and an indicator associated with said pressure responsive means extending from said casing, whereby the partition member unseats and the indicator is rapidly forced out the casing when the pressure in the filter bag is greater by said predetermined amount than the pressure in the compartment.

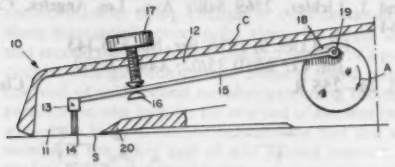
4,020,526
VACUUM CLEANER NOZZLE WITH A MOVABLE BRUSH

Erik Karl Gustav Johansson, Sollentuna, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Dec. 11, 1975, Ser. No. 639,616
Claims priority, application Sweden, Dec. 19, 1974, 7416003
Int. Cl.² A47L *9/04*
U.S. Cl. 15—364 **4 Claims**

1. A vacuum cleaner nozzle having an elongated suction opening located adjacent to the work surface, a brush in said suction opening positioned substantially co-axially therewith, means moving said brush in said opening generally transversely to the longitudinal axis of said brush and having an axis of rotation that is substantially parallel to said longitudinal axis of said brush, said means including a rotatable disc and an elongated arm secured at one end to said disc eccentrically of the axis of rotation of said disc and having said brush at the other end thereof, a support bearing located between the ends

of said arm but being closer to said brush than said disc, said bearing supporting said arm for both axial and tilting movement thereof whereby when said disc is rotated said brush is



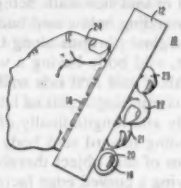
caused to move in a closed elliptical path whereby said brush engages said work surface during a part of its movement and is raised from said work surface during another part of said movement.

4,020,527

GRIP FOR A HAND HELD PORTABLE DEVICE

Wilbur J. O'Neill, 319 Hollyberry Road, W. Severna Park, Md. 21146

Filed Jan. 2, 1976, Ser. No. 646,032
Int. Cl.² G06C *5/00*
U.S. Cl. 16—110 R **7 Claims**



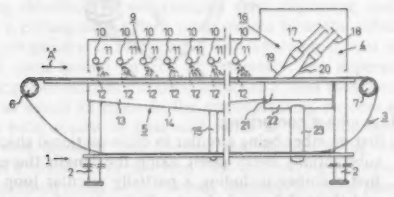
1. In a hand held portable electronic calculator, the improvement comprising:
   a. a calculator body member;
   b. a hollow finger receiving means oriented relative to the keys of the calculator selectively activate any one of the keys of said calculator with the thumb of the same hand while the remaining fingers of the same hand support the rear of said calculator body.

4,020,528

METHOD AND APPARATUS FOR REMOVING SKIN FROM SALTED, SEASONED OR OTHERWISE PRE-TREATED FISH, PREFERABLY HERRING FILETS

Stig Lindbladh, Varstavagen 15 C, 140 32 Grodinge, and Wallis Stahlberg, Kustvagen 6, 294 04 Horviken, Solvesborg, both of Sweden

Filed Aug. 15, 1975, Ser. No. 604,920
Int. Cl.² A22C *25/02*
U.S. Cl. 17—50 **12 Claims**



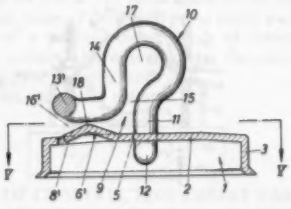
1. A method for removing skin from salted, seasoned or otherwise pre-treated fish, preferably herring filets, comprising the steps of:
   a. preparing the fish by passing the fish filets through cutter means adapted to cut the filets into a central part containing the back fin of the fish, and two side parts, the central part being discarded as waste;
   b. placing the side parts of the filets on conveyor means, with the skin uppermost;
   c. denaturing the skin on the fish filet side parts by contacting the skin with an acid capable of separating proteins by breaking up peptide bonds, for a time period adequate to turn at least a major portion of the skin to be removed into a gelatinous consistency, said contacting being achieved by moving said fish filet side parts on said conveyor means through a spraying station wherein said skin is sprayed with said acid; and
   d. removing the denatured, gelatinous skin, by passing the fish filet side parts on said conveyor through a flushing station wherein at least one knife-blade shaped flushing jet of liquid under pressure is directed on the gelatinous skin against the direction of conveyance, said flushing jet being effective to loosen and remove said gelatinous skin from the fish meat.

4,020,529

UNFASTENING BUTTON, PARTICULARLY FOR UPHOLSTERY

Güenter Klette, Schwelm, Germany, assignor to Firma Astor-Werk Otto Berning & Co., Schwelm, Germany

Filed June 9, 1975, Ser. No. 585,131
Claims priority, application Germany, June 7, 1974, 2427456
Int. Cl.² A44B *1/18*
U.S. Cl. 24—90 TB **8 Claims**



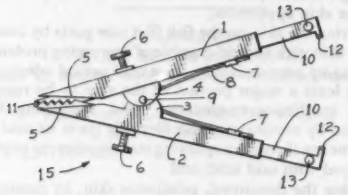
1. An unfastening button, particularly for upholstery, comprising
   a button having a substantially planar bottom part,
   a hook extending from said planar bottom part and defining a locking mouth having an outermost mouth portion for insertion of a loop end of an unfastening thread therethrough and an innermost mouth portion,
   means for locking said mouth of said hook, said means comprising a part of a surface section of said planar bottom part,
   said part of said surface section of said planar bottom part of said button constitutes a tongue,
   said hook has a free end portion communicating with said mouth,
   said tongue in a longitudinal direction thereof has an inverted substantially V-shaped profile with an apex adjacent to said free end portion, said free end portion extending in said longitudinal direction.

4,020,530

SECURABLE MULTI-PURPOSE CLAMP AND INSERTS

James J. A. Sartore, 128 Morris St., Albany, N.Y. 12208

Filed Dec. 15, 1975, Ser. No. 640,882
Int. Cl.² A44B *21/00*
U.S. Cl. 24—252 R 1 Claim



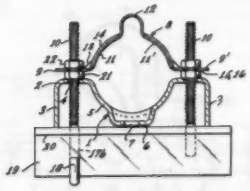
1. A multipurpose clamp comprising a pair of elongated hollow tubular members attached near their midsections thereof by a pivot pin; spring biasing means operably associated with each of said tubular members and said pivot pin whereby the opposite ends of each of said tubular members are automatically biased, by said spring to converge at one end thereof and diverge at the opposite end; each of said tubular members are adapted to receive therein jaw inserts at each end thereof; threaded means are provided at one end of each of said tubular members to retain said jaw inserts therein; the opposite ends of each of said tubular member are adopted to receive hollow tubular jaw inserts screw means attached to each of said hollow tubular jaw inserts to operably connect additional jaw inserts in said hollow tubular inserts.

4,020,531

CLAMP FOR WAVEGUIDES, CABLE OR THE LIKE

Günter Ahrens, Langenhagen; Hans Hermann Hesse, Berlin; Günter Beierfuss, Berlin, and Erich Wagner, Berlin, all of Germany, assignors to Kabel-und Metallwerke Gutenhoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed June 11, 1975, Ser. No. 585,805
Claims priority, application Germany, June 13, 1974, 2428529; Apr. 5, 1975, 2514897
Int. Cl.² B65D *63/00;* A44B *11/00;* F16L *3/08*
U.S. Cl. 24—284 18 Claims



1. Clamp for pressure sensitive cable such as waveguides or the like which must not be deformed by the clamp by means of which such a cable is to be fastened to and held and positioned on frames or other construction parts, comprising:

a first, relatively rigid or stiff and inflexible member of semicylindrical contour and having a portion constructed for engagement with a flat support surface of a construction part, further having a pair of flat arms extending respectively from aximuthal ends of the member and provided for bolting, said arms each continuing in bent-off portions with coplanar edges;

a second clamp member having two, relatively stiff and inflexible, cylindrically curved segments which define a semicylindrical contour and being joined by an outwardly bulging, corrugation like, flexible portion, the second clamp member having also a pair of flat arms extending respectively from azimuthal ends of the curved segments of the second clamp member;

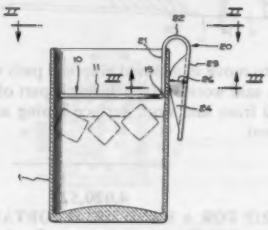
means for connecting the two pairs of arms together; and means for connecting the first member to the construction part.

4,020,532

ONE PIECE MOLDED DEVICE

Sigmund J. Lichter, 2869 Selby Ave., Los Angeles, Calif. 90064

Filed Oct. 9, 1974, Ser. No. 513,343
Int. Cl.² B01D *35/02;* A44G *21/00*
U.S. Cl. 24—255 R 2 Claims



1. A one piece molded plastic device including a body presenting an indicia receivable face and an integral clip having convergent side walls depending from an integral bight portion, the first of said side walls being connected to said body and the second of said side walls being longer than said first side wall and extending below said body, said clip being positionable over marginal portions along the free edge of a generally thin object, said body having a width substantially greater than the width of said first side wall,

protrusion means comprising a pair of laterally spaced ribs formed integrally and longitudinally of said second side wall and protruding toward said body for gripping said marginal portions of said object therebetween,

said rib means having a curved edge facing said object, the widest section of each rib being above the intersection of the body and the first of said side walls for better gripping of the object by the device, the improvement comprising the provision of:

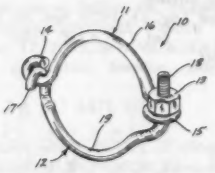
deformable hinge means integral of said body and said clip where said first side wall is connected to said body for selectively adjusting the body between a position generally perpendicular to said first side wall to a position generally planar with said first side wall.

4,020,533

CLAMP

Myron E. Darling, 515 Ohio St., Webster City, Iowa 50595

Filed Sept. 3, 1976, Ser. No. 720,242
Int. Cl.² F16L *33/10*
U.S. Cl. 24—276 1 Claim



1. A clamp comprising:

a first member being circular in cross-sectional shape along substantially every point along the length thereof, said first member including a partially circular loop on one end thereof formed about a first axis and a second partially circular loop disposed on the other end thereof and

formed about a second axis, said second axis being perpendicular to said first axis, and an intermediate portion of said first member being partially circular in shape, said intermediate portion being formed about a third axis which is parallel to the first axis but transverse with respect to the second axis;

a second member being circular in cross-sectional shape along substantially every point along the length thereof, said second member having one end thereof of a partially circular configuration formed about a fourth axis, said one end of said second member extending through the partially circular loop on the one end of the first member whereby a hinge is formed between the first and second members, the other end of said second member being straight and having threads formed about the periphery thereof, said straight end being adapted to be selectively receivable through the partially circular loop in the other end of the said first member, and an intermediate portion of said second member being partially circular in shape and being bent to a diameter identical to the diameter of the diameter of the intermediate portion of said first member; and

internally threaded means adapted to be engaged with the threads of the other end of the second member.

4,020,534
APPARATUS FOR MONITORING STEMS OF ELECTRICAL LIGHT SOURCES DURING MANUFACTURE

Bertalan Fleischer; Ottó Gaál; Sándor Lengyel, and Gyula Pioker, all of Budapest, Hungary, assignors to Egyesult Izzolampa Es. Villamossagi Resveny tarsasag, Budapest, Hungary

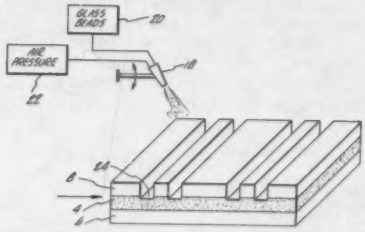
Filed Oct. 6, 1975, Ser. No. 619,653
Int. Cl.² H01J 9/00
U.S. Cl. 29—25.11 **4 Claims**

1. An apparatus for monitoring stems of electrical light sources made on automatic stem-making machinery, each stem having a central, hollow flare tube, an exhaust tube extending therefrom in substantially axial alignment, and a pinch in a portion of the flare tube, remote from the exhaust tube, which pinch is to be provided with a hole on at least one side, the stem having an axis of symmetry; the apparatus comprising: two nozzles disposed adjacent a stem monitoring position at which all stems in the manufacturing process are made to pass; means to pass said stems to said monitoring position and between said nozzles, said nozzles being connected to a source of pressurized fluid and having respective axes of symmetry that define among themselves a first plane, said nozzles being so disposed relative to each other and to said monitoring position that their axes of symmetry intercept at a first angle in said first plane of about 180° ; a second, substantially horizontal reference plane which is perpendicular to the stem axis of symmetry, defining with the first plane a second angle not exceeding 85°; and a flow-sensing device separate from said nozzles, disposed above the upper free end of the exhaust tube and along the stem axis of symmetry, operable to receive fluid flow from said fluid source via at least one nozzle, the hole, and said exhaust tube only in the event that at least one hole is present in the pinch at said monitoring position.

4,020,535
METHOD OF MAKING AN ELECTRO-DISCHARGE ELECTRODE

Edward A. Cuneo, Westminster; Makoto Kato, Santa Ana, and Michael S. Wilson, Costa Mesa, all of Calif., assignors to Metropolitan Circuits, Inc., Costa Mesa, Calif.

Filed Aug. 1, 1975, Ser. No. 601,085
Int. Cl.² H01J 9/02
U.S. Cl. 29—25.18 **12 Claims**



1. In a method for forming an electrical discharge machine electrode tool the improvement comprising:

covering a graphite substrate with a predetermined pattern of protective material to form a desired exposed pattern of substrate surface;

striking graphite the substrate surface with a plurality of spherical glass bead particles having a dimensional size in the range of 200 to 325 mesh and a driven velocity from a pressure range of 20 to 100 psi to erode away a groove pattern of a predetermined depth of substrate in the exposed pattern while not removing the substrate under the protective material, and

removing the protective material.

4,020,536
METHOD OF CONSTRUCTING CREDIT CARDS FOR AUTOMATIC VENDING EQUIPMENT AND CREDIT PURCHASE SYSTEMS

William E. Cuttill, 907 Newport Drive, Fenton, Mich. 48430, and Vilma M. Wagner, 1081 W. Yale, Flint, Mich. 48503

Continuation-in-part of Ser. No. 357,509, May 4, 1973, Pat. No. 3,872,438. This application Jan. 8, 1975, Ser. No. 539,329
Int. Cl.² H01G 4/12
U.S. Cl. 29—25.42 **7 Claims**

1. The method of fabricating a credit card of the self-identifying type in an assembly jig, comprising the steps of:

1. laying a bottom polyester film with a first plurality of preperforated holes in it on the bottom half of the assembly jig;

2. laying a core having a like plurality of like sized and respectively opposed preperforated holes therethrough on top of said bottom film;

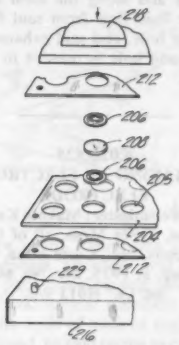
3. inserting in each of said predetermined perforated core holes a lower metal contact to extend through the opposed bottom film holes;

4. inserting in said core holes either high or low dielectric

constant inserts in the coding pattern required for identification;

5. inserting upper metal contacts in the top of each of said perforated core holes;

6. positioning a top polyester film having a like plurality of



like sized and opposed preperforated holes in it on top of said metal contacts and said core; and

7. lowering the top half of the assembly jig into pressing engagement with the bottom half of the assembly for sealing the parts under elevated pressure and temperature for a predetermined time to provide a unitary seal.

4,020,537

HEAD-STOCK FOR A MILLING AND BORING MACHINE

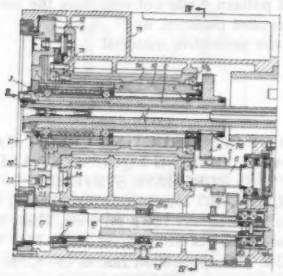
René Deflandre, 6, rue Alfred Dehodencq, 75016 Paris, France

Filed Jan. 21, 1975, Ser. No. 542,720

Claims priority, application France, Jan. 22, 1974, 74.02127

Int. Cl.² B23Q *5/20;* B23B *39/02*

U.S. Cl. 29—26 A 9 Claims



1. A head stock for a milling and boring machine, comprising a head-stock body having a front face, a hollow milling spindle mounted for rotation within said body; a boring spindle mounted within said milling spindle for axial sliding movement with respect thereto and for rotation therewith; a tubular member surrounding said milling spindle and mounted in said body for independent rotation about the milling spindle; and a large diameter ring secured to said tubular member adjacent the front face of the body, and common drive means for selectively driving said ring and said milling and boring spindles at high rotational speeds for machining purposes and separate drive means for selectively driving said ring at slow rotational speeds for indexing purposes.

4,020,538

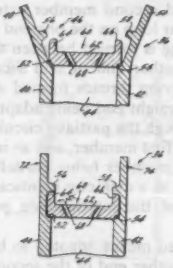
TURBOMACHINERY BLADE TIP CAP CONFIGURATION

Ronald E. Dennis, Cincinnati; William D. Treece, Forest Park, and Robert J. Corsmeier, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 355,150, April 27, 1973, Pat. No. 3,899,267. This application Dec. 9, 1974, Ser. No. 530,720

Int. Cl.² B23P *15/04*

U.S. Cl. 29—156.8 H 3 Claims



1. In a method of making a hollow turbomachinery blade, the steps of: providing an airfoil-shaped blade with a flared open tip end; providing said airfoil-shaped blade with a tip cap seat formed integrally with an inner wall of said flared open tip end and at least one tip cap retaining member spaced from said tip cap seat outer end of the blade; placing a tip cap within said flared open end; and crimping said flared open end to retain said tip cap with said tip cap retaining member while providing a smooth, continuous airfoil contour from a point below the tip cap to the outer end of the blade.

4,020,539

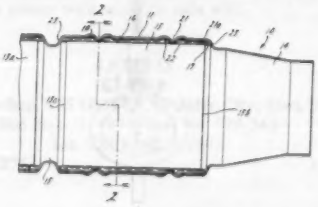
CATALYTIC REACTOR FOR AUTOMOBILE

William R. Vroman, Madison Heights, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Continuation-in-part of Ser. No. 342,575, March 19, 1973, abandoned. This application Mar. 24, 1975, Ser. No. 561,528

Int. Cl.² B23P *15/00;* B01J *8/06*

U.S. Cl. 29—157 R 11 Claims



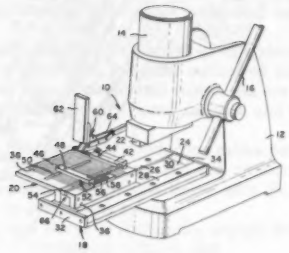
1. In the method of making a catalytic reactor comprising a catalyst treated substrate adapted for axial gas flow therethrough and having an outer peripheral surface around said gas flow and supported within a housing enclosing and spaced from said surface by a compacted fibrous mesh support, said housing having a pair of axially spaced peripheral inwardly extending mesh locating portions spaced axially endwise from the axially opposite ends and peripheral edges of said substrate, said mesh support having locating projections extending endwise of said axially opposite peripheral edges and confined axially between said pair of mesh locating portions, the steps of providing said housing in separate sections extending longitudinally of said axial gas flow, providing a subassembly comprising said mesh support confined tightly around said peripheral surface of said substrate with said locating projec-

tions of said support extending endwise from said axially opposite peripheral edges, arranging said subassembly withhin said housing sections with the locating projections of said support confined axially between said mesh locating portions of said housing spaced axially endwise from said ends sufficiently to avoid clamping said projections around said peripheral edges when said housing sections are clamped and secured together, thereafter clamping said separate housing sections toward said surface with sufficient force transverse to the axis of said gas flow to frictionally hold said housing, mesh support, and substrate together as a unit to prevent the transmission of axial force from said mesh locating portions to the axially opposite ends of said substrate without recourse to auxiliary axial support or other forces for preventing relative axial shifting of said substrate with respect to said mesh support and housing, and thereafter securing said housing sections together while maintaining said transverse force thereon.

4,020,540
APPLICATOR TOOL

Albert Casciotti, Hershey, and Leslie Carl Hall, Jr., Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 661,905, Feb. 26, 1976, abandoned. This application July 27, 1976, Ser. No. 709,158
Int. Cl.² H01R *43/04*
U.S. Cl. 29—749 **24 Claims**



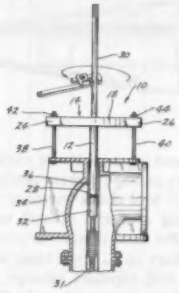
1. An applicator tool for applying an electrical connector onto a flat multi-conductor cable, said tool comprising:
a frame having integral, spaced, upper and lower arms,
ram means mounted in said upper arm for vertical movement,
an upper tooling member mounted on a free lower end of said ram means,
means to actuate said ram means,
guide rail means mounted on said lower arm extending from a point beneath said ram means in cantilever fashion,
a lower tooling assembly including a sliding base mounted in said guide rail means for sliding motion between a point remote from said ram to said point beneath said ram, a base plate assembly fixed to said sliding base and including a base plate, cable guide means, cable clamp means for securing a cable to said base plate, crimping insert means for receiving and guiding contact arms of the connector applied by said tool and for ejecting the contacts when application is completed, and connector guide means aligned with opposite ends of said crimping insert means.

4,020,541
HEAD SHAFT BREAKING TOOL

Gottlieb W. Grosch, Silver Creek, Nebr. 68663

Filed Apr. 21, 1976, Ser. No. 679,026
Int. Cl.² B23Q *1/00*
U.S. Cl. 29—283 **1 Claim**

1. A tool for removing a vertically disposed head shaft extending upwardly from a housing means, said housing means having a pair of horizontally spaced-apart and vertically disposed openings formed therein, said shaft having a coupling means threadably mounted at its lower end which is threadably connected to a shaft portion extending downwardly therefrom, comprising,
an elongated hollow shank portion having upper and lower ends and having a diameter sufficient to permit said shank portion to receive said head shaft so that said head shaft extends upwardly therefrom,
the lower end of said shank portion having a plurality of teeth projecting therefrom for engagement with the coupling means when said shank portion receives said head shaft,

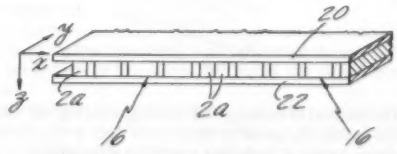


a cross-arm means adjacent the upper end of said shank portion and including means for receiving hold-down bolts extending upwardly from the openings in said pump housing so that said shank portion will prevent the rotation of said coupling means when said head shaft is rotated relative to said shank portion to remove said head shaft from said coupling means.

4,020,542
SANDWICH PANEL FABRICATION

Edward R. Slaughter, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,807
Int. Cl.² B23P *17/00*
U.S. Cl. 29—411 **8 Claims**



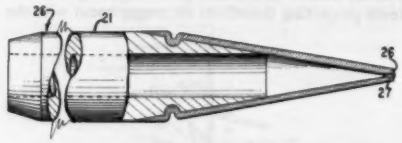
1. In the manufacture of sandwich panels the steps of:
making a core composite stack consisting of a stack of alternating core alloy and rib alloy sheets;
bonding all said sheets together into a unit;
slicing core composite filler assemblies from said unit substantially at right angles to the sheets;
assembling a plurality of filler assemblies between overlying surface panel sheets;
roll bonding said sheets and assemblies together to form a panel; and
leaching the core alloy from the roll bonded structure.

4,020,543

TWO-PIECE CAPILLARY TIP BONDING TOOL

Matheus D. Pennings, Los Altos Hills, Calif., assignor to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed June 26, 1975, Ser. No. 590,516
Int. Cl.² B23P *17/00*; B23K *3/02*; H01R *43/02*
U.S. Cl. 29—423 5 Claims



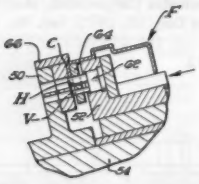
1. The method of making a lead wire capillary bonding tool having a wire capillary passage therein comprising the steps of filling a tubular metal tool shank member with a removable core material, shaping one end of said tubular metal tool shank member with the core therein to provide a contour of the interior of a capillary tip having a taper and a small projection the size of the wire capillary passage, vapor depositing refractory metal without cementitious binder on the shaped capillary contour including a portion of the shank, and then removing said core.

4,020,544

METHOD OF FORMING AND LOCATING MOLDING CLIP REGISTERS IN A METAL DOOR FRAME

Edward A. Smith, 6641 W. 6th St., Los Angeles, Calif. 90048, and Robert L. Day, 1518 Grismer St., Burbank, Calif. 91504

Division of Ser. No. 491,102, July 23, 1974. This application Feb. 6, 1976, Ser. No. 655,697
Int. Cl.² B21D *39/00*; B23P *11/00*; B26D *1/00*, *3/00*
U.S. Cl. 29—513 4 Claims



1. The method of forming and locating molding clip locating registers in the flange of a metal door frame structure, the door frame having a jamb part extending substantially at right angles to said flange, said method comprising the following steps:

a. supporting the jamb part on a die member surface with the flange overhanging an end of the surface for the flange to hang free whereby the said die member is positionally coordinated with reference to the said jamb part independently of the distal edge of said flange; and

b. forming a series of locating registers along the length of said flange by the aid of tool members dimensionally located with reference to said die member surface.

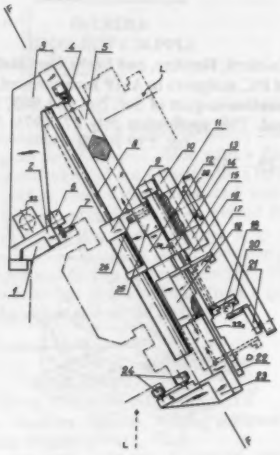
4. The method as set forth in claim 1 together with the step of securing clips at said locating registers.

4,020,545

APPARATUS FOR AUTOMATIC TOOL CHANGING IN A LATHE

Ivan Assenov Slavinski; Todor Dimitrov Angelov; Dmitri Dmitrievich Vukolov; Eduard Todorov Burgudjiev, and Mihail Dimitrov Komitovski, all of Sofia, Bulgaria, assignors to DSO "ZMM", Sofia, Bulgaria

Filed Feb. 25, 1974, Ser. No. 445,478
Claims priority, application Bulgaria, Feb. 24, 1973, 22584
Int. Cl.² B23Q *3/155*
U.S. Cl. 29—568 8 Claims



1. A lathe including device for automatic tool changing said lathe having a spindle with a horizontal axis, the tools of the lathe being fixed in tool holders and together with the tool holders forming tool units, the lathe being supplied with a first tool magazine located stationary relative to said horizontal axis, the lathe having a tool rest on which the changeable tool units are fastened in a one-seat mounting element, and means for fixing a tool unit on said mounting element, the tool changing device comprising a support frame mounted for reciprocation between the tool rest and the first magazine of the lathe parallel to the spindle axis, the support frame having a vertical beam extending transverse to the spindle axis, the improvement wherein the device further comprises a first slide supported for non-rotatable vertical reciprocation on the beam toward and away from the spindle axis, a second slide supported for non-rotatable vertical reciprocation on the beam relative to the reciprocation of the first slide, means for reciprocating the second slide with respect to the first slide, a two-seat magazine for the tool units fixedly mounted on the second slide, and means carried by the first slide for linearly translating tool units along the spindle axis between the first and second magazines and between the second magazine and the fixing means on the tool rest of the lathe, the translating means including means for horizontally introducing the tool units into and horizontally withdrawing the tool units from the fixing means, the first magazine, and the second magazine, respectively.

4,020,546

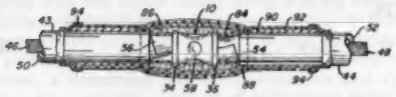
METHOD FOR MAKING A CABLE SPLICE JOINING A PAIR OF FLEXIBLE CONDUCTING CABLES

Francis A. May, Pittsburgh, Pa., assignor to Consolidation Coal Company, Pittsburgh, Pa.

Division of Ser. No. 562,228, March 26, 1975, Pat. No. 3,980,806, which is a continuation-in-part of Ser. No. 179,445, Sept. 10, 1971, abandoned. This application May 26, 1976, Ser. No. 690,363

Int. Cl.² H01R *43/04*

U.S. Cl. 29—628 **8 Claims**



1. Method for making a cable splice joining a pair of flexible conducting cables comprising,

shaping the end portions of a metallic sleeve having a cylindrical body by cutting said sleeve body along a diagonal from adjacent said end portions,

flaring the inner cylindrical surface of said body adjacent said cut end portions radially outwardly to form rounded end portions with the outer surface of said cylindrical body,

urging said diagonal cut portion of said sleeve body to a position parallel to the outer surface of said cylindrical body to form adjacent said sleeve end portions annular portions having flared inner surfaces and rounded end portions,

inserting the ends of the conducting cables having the insulation stripped therefrom and the conductors exposed into opposite ends of said sleeve with the ends of the cables in overlapping relation,

crimping said sleeve to frictionally engage the ends of the cables in overlapping relation, and

sealing the exposed ends of the cables and said sleeve to provide an electrically insulated and moisture and abrasion resistant cable splice.

4,020,547

POLARIZING KEY INSERTION TOOL

Edward F. Du Bois, Binghamton, N.Y., assignor to The Singer Company, Binghamton, N.Y.

Filed July 28, 1975, Ser. No. 599,724

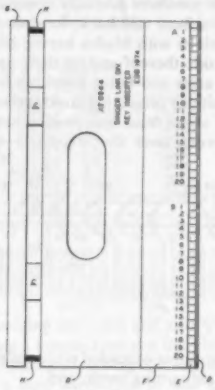
Int. Cl.² H02G *15/00*

U.S. Cl. 29—629 **3 Claims**

1. A method of inserting polarizing keys in printed circuit board connectors comprising the steps of:

inserting a polarizing key into an indexed location of a key inserting tool said indexed locations corresponding to polarizer key groove locations in a printed circuit board connector;

mating the key inserting tool with said printed circuit board connector to align said key with the desired location in said printed circuit board connector; and



operating the key inserting tool to eject and emplace said key in the connector at the desired location.

4,020,548

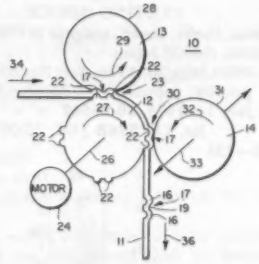
FORMING AND STRIPPING OF CONDUCTORS

Herbert Adolf Pohl, Rariton County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Aug. 25, 1976, Ser. No. 717,783

Int. Cl.² H01R *9/00*

U.S. Cl. 29—630 R **8 Claims**



1. A method of so operating on an elongated insulated conductor as to form a projection at an interconnection area along the conductor and to remove the insulation from the conductor at said interconnection area, the method comprising the steps of:

a. in a forming location, engaging with said interconnection area along the conductor, a protuberance shaped to form a projection in the conductor about the protuberance; then

b. advancing said protuberance, with the projection retained thereon, into an insulation removing location spaced from said forming location; and then

c. removing the insulation from the conductor at said interconnection area while said protuberance, with the projection retained thereon, is disposed in said insulation removing location.

4,020,549

HAIR CUTTER COMB

Syd Edwards, 141 Grand View, Leucadia, Calif. 92025

Filed Nov. 5, 1975, Ser. No. 628,987

Int. Cl.² B26B *21/12, 19/38*

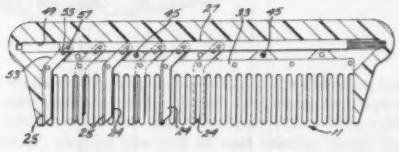
U.S. Cl. 30—30 **10 Claims**

1. A hair cutter comb comprising:

a comb including a stationary cutter formed with an elon-

gated back having parallel cutting teeth projecting from one side thereof and formed on one side along their respective one edges with cutting edges;

a blade mechanism on said one side and including a plurality of blade members pivotally mounted along their medial portions from said back, formed on their respective one extremities with blades having blade edges formed along one side thereof and on their opposite extremities with lever arms and being rotatable from respective retracted positions projecting coextensive with said back to shield said edges from hair passing between said cutting teeth to sweep over the respective underlying cutting



teeth to respective extended positions projecting coextensive with said cutting teeth; and

an actuator bar carried from said back for reciprocatory travel therealong and pivotally connected with said individual lever arms said actuator when shifted in one direction rotates said blade members to their retracted positions with said edges shielded by said back and when shifted in the opposite of said one direction pivots said blade members to their extended position to sweep said blades across the underlying blade edges to progressively sever the strands of hair caught between said blade and cutting edges.

4,020,550

CUTTING DEVICE

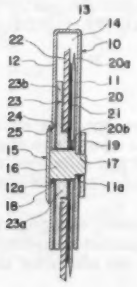
Yoshio Okada, Osaka, Japan, assignor to Okada Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 20, 1976, Ser. No. 688,301

Claims priority, application Japan, May 24, 1975, 50-62342; July 14, 1975, 50-86545

Int. Cl.² B26B *3/08, 25/00*

U.S. Cl. 30—124 **9 Claims**



1. A cutting device which comprises:

a holder including a pair of spaced plate members connected at one peripheral edge to each other to define an accommodation space therebetween;

a cutting disc having an outer periphery defined into a peripheral blade, said cutting disc being operatively accommodated within said accommodation space;

means for supporting said cutting disc in position within said accommodation space with a portion of said peripheral blade situated outside said accommodation space for use in actual cutting of a material to be ultimately cut into two separate fractions;

padding disc means; and

means for supporting said padding disc means within said accommodation space and in side-by-side relation to said cutting disc for rotation thereabout, said padding disc means acting, during cutting operation with the cutting device moved along an intended line of cutting on said material, to retain said material in position while being rotated in contact with said material.

4,020,551

ICE-PROD

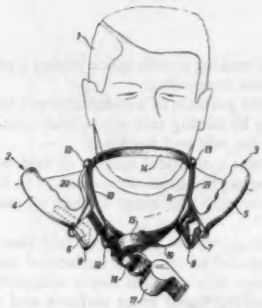
Lars-Hakan Lindqvist, Solrosstigen 1, 133 00 Saltsjobaden, Sweden

Filed Jan. 26, 1976, Ser. No. 652,521

Claims priority, application Sweden, Jan. 31, 1975, 7501129

Int. Cl.² B26B *29/00*

U.S. Cl. 30—164.8 **10 Claims**



1. An ice-prod self-rescuing set comprising,

a flexible collar adapted to be worn about the neck of the user,

a pair of sheaths ecured to said collar in a position readily capable of being reached by the user, and

a pair of prods adapted to be held respectively in each sheath,

said prod comprising an angular ice-engaging tip and a handle extending from one end thereof,

said handle having a knuckle guard projecting from the tip outwardly and to the rear of said handle to insure that when grasped by the user the prod is automatically turned with its tip in the correct position for use.

4,020,552

MOWING APPARATUS

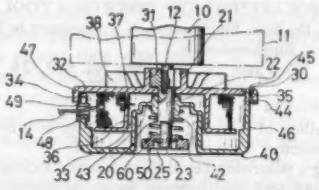
Hitoshi Mizuno, and Satoshi Akiyama, both of Odawara, Japan, assignors to Kabushiki Kaisha Shikutani, Odawara, Japan

Filed Apr. 19, 1976, Ser. No. 678,456

Claims priority, application Japan, Feb. 3, 1976, 51-10047

Int. Cl.² A01D *35/26;* **A01G** *3/06*

U.S. Cl. 30—276 **7 Claims**



1. A mowing apparatus comprising, in combination, an

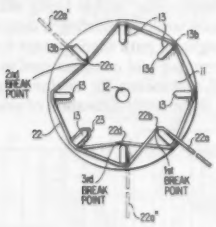
output axis and rotary power means mounted on supporting means, said output axis being rotatably connected with said rotary power means, a rotary casing detachably and coaxially secured to said output axis for rotation therewith in a cutting plane, said rotary casing including top reel-like and bottom cap-like members adapted to be coupled with each other, said top reel-like member having upper and lower disk portions and an intermediate cylinder portion therebetween, a cutting string made of a high polymer synthetic material coiled about said cylinder portion, said bottom cap-like member having a peripheral wall portion and a centrally upwardly recessed bottom portion for containing therein said intermediate cylinder portion and said lower disk portion of the top member together with said coiled cutting string, a fixing member detachably mounted on said output axis for elastically fixing said bottom member to said top member, at least one guide member provided in said peripheral wall portion of said bottom member, a connecting member provided on said cylinder portion for connecting one end of said cutting string therewith, said cutting string extending through said guide member out of said casing to form a cutting flail with an effective working length in said cutting plane during rotation.

4,020,553

FILAMENT VEGETATION TRIMMER WITH BASKET WOVEN AUTOMATIC FEED MEANS AND METHOD

Cynthia Ann Pittinger, Weatherford, Tex., assignor to Charles B. Pittinger, Weatherford, Tex.

Filed Sept. 3, 1976, Ser. No. 720,237
Int. Cl.² A01D *55/18*
U.S. Cl. 30—347 **12 Claims**



1. A vegetation filament cutter head comprising: a circular base, a plurality of upstanding members circumferentially spaced on the base, a filament engaging the plurality of the upstanding members, means for mounting the base for rotating and swinging a portion of the filament for cutting and means for retaining the filament during cutting.

4,020,554

PORTABLE PUNCH

Eugene E. LaTourette, R.D. No. 1, Cambridge Springs, Pa. 16403

Filed Dec. 30, 1975, Ser. No. 645,412
Int. Cl.² B26F *1/00*
U.S. Cl. 30—358 **9 Claims**

1. A punching device for cards of the type having rows of indicia disposed in columns on said cards,

said punching device having,

a base having a transverse slot therethrough providing a card supporting means and having a longitudinal groove traversing said slot with an intermediately disposed web traversing said groove and spaced from the bottom thereof and fixed to the sides defining said groove,

a slide supported on said base,

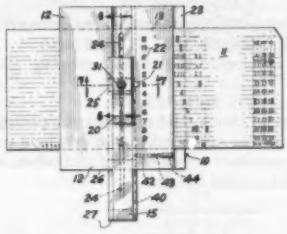
means on said base guiding said slide to move in a direction parallel to said columns,

a punch supported on said slide,

die means on said slide to receive said punch for punching out said indicia at selected positions in said rows and in said columns on said card,

means on said base for holding said slide at the selected position relative to said card,

said slide has an upper leg and a lower leg disposed parallel to each other and define a space therebetween,



said space receiving said card and said web,

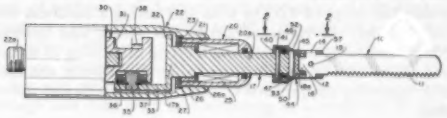
said web having a longitudinal slot therein parallel to said legs of said slide for viewing the said columns of said indicia on a card supported in said card supporting means.

4,020,555

CONNECTING MECHANISM FOR A SAW BLADE

John R. Hedrick, La Crescenta, Calif., assignor to Pevrick Engineering Co., Inc., Sun Valley, Calif.

Filed Apr. 12, 1976, Ser. No. 675,924
Int. Cl.² B27B *19/09*
U.S. Cl. 30—392 **12 Claims**



1. In combination:

a reciprocating shaft;

means for releasably mounting a tool on one end of said shaft;

said mounting means comprising a collar mounted exteriorly on said one end of said shaft for limited rotation between first and second angular positions;

a socket on said one end of said shaft for receiving one end of said tool; at least one slot in said collar;

at least one projection on said one end of said tool movable through said slot when said collar is in said first position; and

a pocket in said collar in communication with said slot for receiving said projection when said collar is in said second position;

said pocket transmitting the reciprocation of said shaft to said tool.

4,020,556

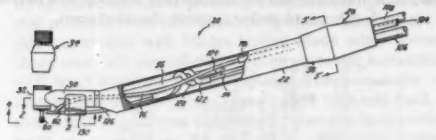
AIR DRIVEN DENTAL HANDPIECE

Kurt Sotman, Penn Wynne, Pa., assignor to Star Dental Manufacturing Co., Inc., West Conshohocken, Pa.

Filed Jan. 14, 1972, Ser. No. 217,745
Int. Cl.² A61C *1/10*
U.S. Cl. 32—27 **8 Claims**

1. In a dental handpiece comprising a hollow handle and a rotatable chuck mounted in said handle, the improvement comprising a fiber optic lighting system within said handle, said fiber optic lighting system comprising a plurality of light transmitting fibers, said system having a terminus adjacent

said rotary chuck, said terminus projecting from said handle and being adapted to direct light passing through said fiber optic lighting system to the area around a dental bur which is



secured in said rotary chuck, said terminus comprising a pair of tubes projecting from said handle, with said light transmitting fibers being contained within each of said tubes, and said tubes being spaced on said handle.

4,020,557

COMPOSITE FOR DENTAL RESTORATIONS

Thomas J. Rockett, East Greenwich, R.I.; John S. Tiffany, Camarillo, and John J. O'Connell, Tustin, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Continuation-in-part of Ser. No. 416,808, Nov. 19, 1973, abandoned. This application Sept. 18, 1974, Ser. No. 507,223

Int. Cl.[2] A61K *5/06;* **C08K** *3/34*

U.S. Cl. 32—15 **9 Claims**

1. A method for preparing a dental restoration, comprising the steps of mixing and chemically coupling (a) a non-toxic and substantially waterinsoluble inorganic compound having a hardness within the range of 3.0 to about 4.5 Mohs and in the form of a powder having finely-divided particles of an average size less than 15 microns with (b) minor proportion of a methacrylate polymeric resin binder having a refractive index within the range of 1.53 to 1.56 and having a hardness when cured within the range of 2.0 to 4.0 Mohs, said inorganic compound being selected from a group consisting of silicates and phosphates of crystalline and amorphous form, and thereafter applying the mixture to a site requiring dental restoration.

4,020,558

BUCCAL IMPLANT FOR ADMINISTERING SOLUBILIZABLE PRODUCTS

René Cournut, Bordeaux-Cauderan, and Gilbert Gaussens, Meudon, both of France, assignors to Societe Sodermec, Souillac, France

Filed July 21, 1975, Ser. No. 597,787

Claims priority, application France, July 19, 1974, 74.25254

Int. Cl.[2] A61C *3/10*

U.S. Cl. 32—40 R **11 Claims**

1. A buccal implant for passing solubilizable substances contained in said implant into the saliva by maintaining part of the implant close to the gum, wherein said implant is constituted by at least one plate of small thickness formed of material containing solubilizable substances and by means for fastening the plate to the teeth, said means being intended to maintain said plate in the vicinity of the gum.

4,020,559

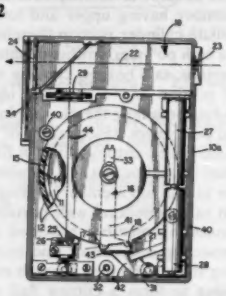
BEARING COMPASS

Allen Butman Sherman, Pembroke, Mass., assignor to E. S. Ritchie & Sons, Inc., Pembroke, Mass.

Filed Dec. 22, 1975, Ser. No. 643,313

Int. Cl.[2] G01C *17/12*

U.S. Cl. 33—272 **9 Claims**



1. A portable, hand-held bearing compass for taking bearings during the day and at night comprising: a hollow housing; a magnetic compass mounted in said housing, said compass having a compass card mounted for rotation about a vertical axis; a viewing window provided in said housing through which compass readings can be taken; a sighting barrel having an eyepiece, said barrel being associated with said housing for viewing a distant object along a horizontal sighting path; a reticle mounted within said housing offset from said sighting path; manually activated means for illuminating said reticle; a semi-reflective mirror positioned within said sighting barrel across said sighting path, said mirror being angled to reflect the image of said illuminated reticle along said sighting path towards said eyepiece while permitting a distant object to be viewed along said sighting path through said eyepiece; means for continuously clamping said compass card in the absence of reticle illumination; and means for unclamping said compass card in response to the manual activation of said reticle illumination means.

4,020,560

BOW SIGHTS AND METHODS OF MAKING AND USING THE SAME

Albert Heck, 1131 Grand Prix, St. Charles, Mo. 63301

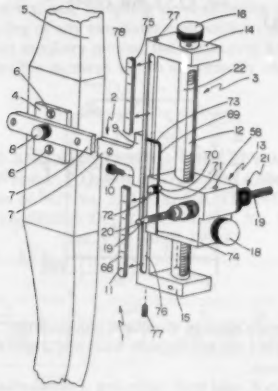
Filed Apr. 7, 1975, Ser. No. 565,650

Int. Cl.[2] F41G *1/00;* **F41B** *5/00*

U.S. Cl. 33—265 **7 Claims**

1. In a bow sight for an archery bow having an elongated support member mounted on said bow and extending in the general direction of the target, and a sight assembly carried by said elongated support member, said sight assembly including a housing disposed generally vertically, a lead screw mounted at its ends on the housing and spaced therefrom between said ends, and a sight block embracing said lead screw but slidably mounted with respect thereto, the improvement comprising a plunger reciprocably mounted in said sight block, said plunger having at one end means for engaging said lead screw, and a spring mounted to bias said plunger and engaging means linearly toward engagement with said lead screw, the other

end of said plunger being manipulable to reciprocate said plunger between positions of engagement of said lead screw



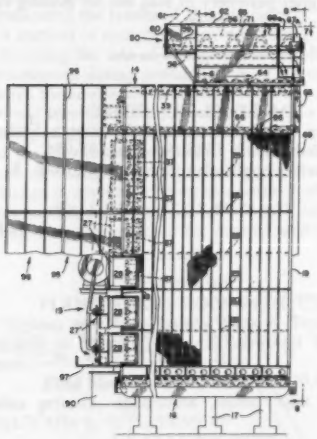
engagement means with said lead screw and non-engagement therewith.

4,020,561

METHOD AND APPARATUS FOR DRYING GRAIN

Bernard C. Mathews, 7919 Rte. 14, Crystal Lake, Ill. 60014

Filed Dec. 17, 1975, Ser. No. 641,558
Int. Cl.² F26B *17/12*
U.S. Cl. 34—13 10 Claims



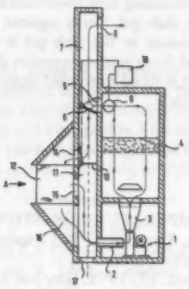
1. The method of drying moist grain in a perforated wall type dryer having cross-flow air which traverses a descending grain column comprising the steps of removing a substantial portion of the fines from the moist grain prior to entry thereof into said grain column, causing said grain column to descend through at least three superposed heating zones, the temperature of each heating zone beneath the uppermost being less than that of the heating zone next above it, said grain column being traversed in each heating zone by an airstream blowing outwardly into the atmosphere, causing said grain column to descend through a cooling zone beneath the lowermost of said heating zones, said grain column being traversed by an airstream blowing inwardly from the atmosphere, concentrating said inwardly blowing airstream after said grain column has been traversed thereby, filtering the fines from said concentrated airstream, and discharging said concentrated and filtered airstream for mixture with atmospheric air.

4,020,562

METHODS AND APPARATUS FOR THE PREPARATION OF PALE MALT

Heinz Weyermann, Paradiesweg 6, 86 Bamberg, Germany

Filed May 27, 1975, Ser. No. 581,165
Claims priority, application Germany, Feb. 13, 1975, 2505942
Int. Cl.² F26B *7/00*
U.S. Cl. 34—12 6 Claims



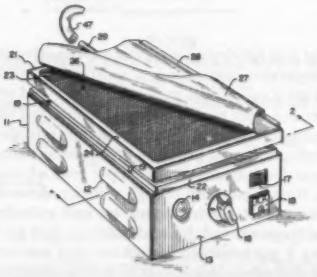
1. In a process for the preparation of pale malt comprising the steps of steeping corn and subsequently germinating said corn to produce green malt and thereafter kiln-drying said green malt to produce pale malt, said kiln drying including the steps of withering said green malt by passing a first inlet air stream at a temperature of up to 60° C through said green malt for a time sufficient to wither said malt, whereby a first exhaust air stream containing moist air issues from said malt during said withering; and passing a second inlet air stream through said malt after said withering at a temperature of up to 85° C for a time sufficient to dry the malt, the improvement comprising humidifying the air for said first inlet air stream.

4,020,563

SLAB GEL DRYER AND METHOD

Stanton A. Hoefer, San Francisco, Calif., assignor to Hoefer Scientific Instruments, San Francisco, Calif.

Filed Apr. 21, 1975, Ser. No. 569,838
Int. Cl.² F26B *19/00*
U.S. Cl. 34—48 11 Claims



1. An appartus for dehydrating slab gels comprising a porous filter sheet for contacting the slab gel on one side thereof, an overlay sheet for contacting the slab gel on the other side thereof, said overlay sheet having a smooth non-porous surface thereby being nonadherent to the slab gel, a platen, said

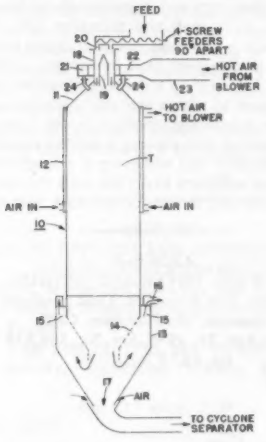
platen having a depression formed on one side having boundaries including a bottom with a predetermined area for receiving said overlay and porous filter sheets, a compliant cover overlaying said depression and having a size greater than said predetermined area, said depression having an opening through one boundary thereof, means for communicting a vacuum source with said opening for producing low pressure in said depression, means for uniformly supporting and for providing substantially uniform dispersal of said low pressure over the side of said porous filter sheet facing said bottom boundary, and a heater disposed on the other side of said platen, so that when the slab gel is placed between said overlay and porous filter sheets and disposed in said depression and low pressure is induced therein, ambient pressure forces said compliant cover against the periphery of said depression thereby providng providing seal therebetween and said overlay sheet holds the slab gel firmly against said porous filter sheet, whereby moisture in the slab gel is vaporized by said heater and removed from said depression through said opening and the slab gel is fixed onto said porous filter sheet in a dehydrated condition.

4,020,564

DRIER FOR TEMPERATURE SENSITIVE MATERIALS

Ronald W. Bayliss, Flemington, N.J., assignor to NL Industries, Inc., New York, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,190
Int. Cl.² F26B *17/00;* **F27B** *15/00*
U.S. Cl. 34—57 R **5 Claims**



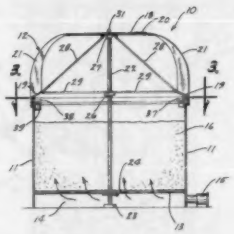
1. Apparatus for drying temperature-sensitive solid materials said apparatus comprising: a substantially vertical drying tower having a cylindrical inlet at its upper end and an outlet at its lower end, feed means arranged to feed the solid material to be dried into said inlet and from thence into the upper end of said drying tower in the form of a substantially cylindrical curtain, gas feed means at the upper end of said tower arranged to form a plurality of high velocity, downwardly moving streams of hot gas impinging on said cylindrical curtain thereby to fragment and dry said material, said gas feed means comprising a gas manifold connected to a source of hot gas, and a plurality of nozzles in said manifold arranged to circumscribe the inlet of said drying tower and to cause impingement of the moving streams of hot gas from the exterior to the interior of the cylindrical curtain of downwardly moving material and means at the outlet of said tower arranged to separate the substantially dry material from the hot gases exiting from said tower.

4,020,565

DRAFT INDUCING ROOF FOR STORAGE STRUCTURES

Sylvester L. Steffen, R.R. 3, New Hampton, Iowa 50695

Filed Oct. 28, 1975, Ser. No. 625,953
Int. Cl.² F26B *19/00*
U.S. Cl. 34—93 **12 Claims**



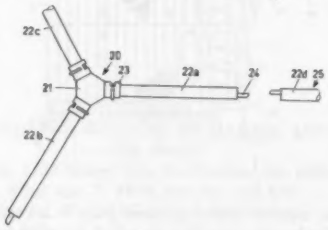
1. A seed grain storage structure comprising:
a circular grain bin having side walls and a space therein for storing grain;
a circular roof, said roof including a substantially horizontally disposed fluid impervious central plate member for substantially preventing precipitation from entering the bin and a plurality of turbine-shaped vanes having openings formed therebetween in communication with said space and with ambient air, whereby rotation of said roof causes air to pass through the openings between the vanes; and
means for rotatably mounting said roof to said grain bin including a plurality of circular members rotatably attached to one of the lower periphery of said roof and the upper periphery of said grain bin, and guide means attached to the other of said lower periphery of said roof and the upper periphery of said bin for guiding contact with said circular members.

4,020,566

MOLECULAR MODELS

André Dreiding, Langackerstrasse 43, Herrliberg, Switzerland

Filed Mar. 3, 1975, Ser. No. 555,056
Claims priority, application Switzerland, Mar. 5, 1974, 3037/74
Int. Cl.² G09B *23/26;* **A63H** *33/08*
U.S. Cl. 35—18 A **21 Claims**



1. A set of structural elements for forming stereochemical models of molecular bonds between polyvalent atoms, each structural element having at least two connector arms representing the valences of at least one atom, each of said connector arms having opposite inner and outer end portions and being coupled at its inner end portion with a corresponding end portion of at least one other of the connector arms of the same structural element, the outer end of each connector arm comprising manually operable means for pairwise equiaxial coupling and uncoupling the arm to or from a corresponding outer end portion of another connector arm of the same struc-

tural element or of another one of the structural elements, wherein the means for pairwise coupling and uncoupling the outer end portions of the connector arms comprise identically designed coupling devices at each outer end portion of all connector arms, said coupling devices being configured for direct coupling of any two outer end portions of all connector arms without auxiliary means, the connector arms each comprising a flexible element which is normally rectilinear when unloaded.

4,020,567

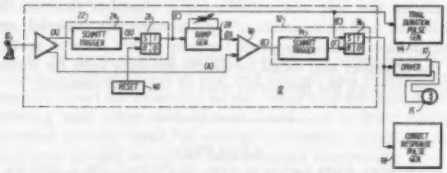
METHOD AND STUTTERING THERAPY APPARATUS

Ronald L. Webster, P.O. Box 9737, Hollins College, Va. 24020

Continuation of Ser. No. 322,618, Jan. 11, 1973, abandoned. This application Oct. 16, 1974, Ser. No. 515,341

Int. Cl.² G09B *19/04*

U.S. Cl. 35—35 C **24 Claims**



1. A method of speech therapy comprising the steps of:

a. providing a electrical signal related to a subject's speech;

b. providing in response to the speech related electrical signal a time varying reference electrical signal related in amplitude to an acceptable amplitude for the subject, the amplitude being independent of the subject's speech;

c. comparing the electrical signals for a predetermined time interval; and,

d. indicating the results of the comparison.

5. A method of speech therapy comprising the steps of:

a. detecting the rate of change in the amplitude of sounds enunciated during pronunciation of a word from a time when the amplitude of the sounds exceed a first predetermined threshold to a predetermined time thereafter;

b. comparing the detected rate of change in the amplitude of the enunciated sounds to a predetermined acceptable rate of change in amplitude, the predetermined rate of change in amplitude being independent of the identity of any sounds enunciated; and,

c. indicating the results of the comparison.

4,020,568

PLANETARIUM MOON PROJECTOR

Yuzo Tajima, and Toru Okada, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaki, Japan

Filed Mar. 24, 1976, Ser. No. 670,024

Claims priority, application Japan, Apr. 4, 1975, 50-46316[U]; May 8, 1975, 50-56548

Int. Cl.² G09B *27/00*

U.S. Cl. 35—42.5 **10 Claims**

1. A planetarium moon projector comprising:

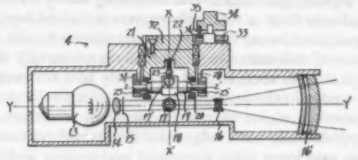
projecting means for projecting an image of a moon onto a screen including a lamp, a condenser lens, a full moon plate and first and second occulting members;

driving means for driving the moon projector in accordance with the movement of real moon;

said first and second occulting members being alternatively rotatable about an axis perpendicular to the projecting means optical axis for occulting the projected moon and each of said occulting members being interchangeable with the other;

changing means for interchanging said first occulting member with said second occulting member so as to move said second occulting member into the moon image projected path while transferring said first occulting member out of said image path;

said changing means including a rotatable member supporting said occulting member and having an intermittent gear means on said rotatable member, said gear means



being movable along a cylindrical rail having a rack means and centered about said axis perpendicular to said optical axis as said rotatable member is driven by said driving means and engageable with said rack means provided on said rail to interchange said first occulting member with said second occulting member.

4,020,569

SOLE OF A FOOTWEAR

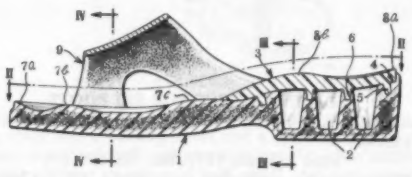
Tatsuo Fukuoka, No. 3, 3-ban, 2-chome, Shin-Minami-Fukushima, Tokushima, Japan

Filed Aug. 11, 1975, Ser. No. 603,303

Claims priority, application Japan, May 1, 1975, 50-60450[U]

Int. Cl.² A43B *13/20, 3/12, 13/12*

U.S. Cl. 36—29 **8 Claims**



1. A sole of a footwear comprising a soft sole body provided at a rear half thereof with at least one upwardly opening recess and a reinforcing plate serving also as an insole which is mounted on said rear half of said sole body so as to cover said recess, said reinforcing plate comprising a body formed of relatively rigid synthetic resin material and a metal frame embedded into said body.

4,020,570

CUSHIONED INSOLE FOR FOOTWEAR SUCH AS SHOES, BOOTS, OR THE LIKE

Jerry Shames, New York, N.Y., assignor to Hiraoka New York, Inc., New York, N.Y.

Filed Oct. 10, 1975, Ser. No. 621,300

Int. Cl.² A43B *13/38*

U.S. Cl. 36—44 **1 Claim**

1. A cushioned insole for use with footwear such as a shoe, a boot or the like, said insole comprising: a multi-layered laminate having a periphery conforming generally to the shape of the inside surface of the sole of the footwear, a first raised

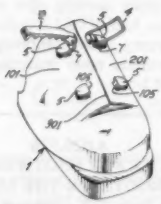
portion extending upwardly from the upper surface of said laminate and located so as to provide support for the wearer's arch, a second raised portion extending generally upward from the upper surface of said laminate and located so as to provide support for the wearer's metatarsis, and a third raised portion extending upwardly from the upper surface of said laminate and located so as to provide support for all of the wearer's phalanges, said insole extending along a central longitudinal axis from a relatively narrow unraised heel portion starting at a rearward heel end, to an unraised arch mid-section thereof, thereafter to a gradually transversely wider unraised phalanges section, and ultimately to a forward to end, an outer edge of the insole along said wider phalanges section lying generally closer to said longitudinal axis than an inner edge opposite said outer edge, said first raised portion extending from said inner edge along said mid-section and said heel portion to points less than half the distance toward the outer edge, said second raised portion being spaced from said first raised portion and said outer and inner edges such that unraised mid-section surfaces are disposed therebetween, said second raised portion having a generally elliptical peripheral shape and being disposed substantially mid-length between said heel and toe ends, said third raised portion extending generally transversely entirely across said longitudinal axis and interconnecting said outer and inner edges at said phalanges section, said laminate being comprised of a spongy, central core layer, a thin plastic layer secured to the upper surface of said central layer and a thin layer of fibrous material secured to the lower surface of said central layer, and wherein the thickness of said first raised portion exceeds the thickness of said second and third raised portions.

4,020,571

LACING DEVICE FOR SKI BOOTS

Icaro Olivieri, 10, via Feltrina Nord, Montebelluna, Italy (31044)

Filed June 25, 1976, Ser. No. 699,700
Claims priority, application Italy, July 4, 1975, 12685/75
Int. Cl.² A43B *11/00*; A43C *11/00*
U.S. Cl. 36—50 **6 Claims**



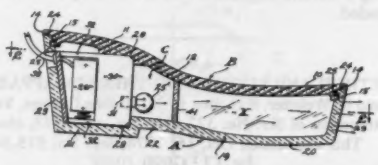
1. In a ski boot of the type comprising a ski boot upper provided with two flaps defining an opening, a lacing device including a hooked lever-like lacing member provided on one flap intended to cooperate with a ring-like lacing member on the other flap, said lacing members being secured hingedly and in a removable manner to the said flaps at the sides of the opening, by means of anchoring elements, each anchoring element consisting of an elastic open ring presenting end portions coaxially directed towards each other, said open ring being anchored on a correspondingly shaped projection provided on the ski boot flap, so as to encircle said projection and penetrate with its coaxially directed end portions inside corresponding side cavities or borings located in correspondence of the extremities of the lacing members.

4,020,572

ILLUMINATED FOOTWEAR

Gasper Chiaramonte, Jr., 229 Court Ave., Lyndhurst, N.J. 07071

Filed Feb. 17, 1976, Ser. No. 658,383
Int. Cl.² A43B *23/00*
U.S. Cl. 36—137 **5 Claims**



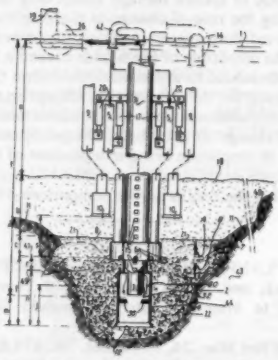
1. A shoe platform comprised of a sole having an upstanding perimeter wall carrying a foot supporting instep coextensively overlying the sole and establishing a chamber therein, the perimeter wall being made of light transmitting material, and illumination means comprising a lamp within an arch section of the chamber and faced forwardly emitting light for illuminating through the perimeter wall of the shoe platform.

4,020,573

METHOD AND DEVICE FOR SUCKING UP A SOLID SUBSTANCE FROM A STOCK

Hendrik Franciscus Wegewijs, Utrecht, and Tjako Aaldrik Wolters, Vianen, both of Netherlands, assignors to Ballast-Nedam Group N.V., Amstelveen, Netherlands

Filed Feb. 21, 1975, Ser. No. 551,549
Claims priority, application Netherlands, Feb. 25, 1974, 7402559
Int. Cl.² E02F *3/88, 7/00*
U.S. Cl. 37—63 **21 Claims**



1. The method of winning pure sand from a mixture of sand and mud which comprises the steps of:

a. injecting water into the mixture to form a pocket of fluidized sand from which the mud has been upwardly flushed;

b. maintaining said pocket of fluidized sand by injecting water within said pocket to form a segregation zone extending across the mouth of the pocket;

c. controlling the injected flow of step (b) such that mud cannot penetrate through said segregation zone and thus remains above the segregation zone while sand may penetrate through said segregation zone and flow into said pocket;

d. withdrawing a suspension of sand in water at a withdrawal region spaced below said segregation zone and conveying it to a remote discharge region; and

e. controlling the spacing of said withdrawal region below

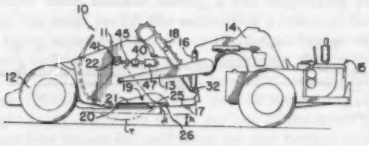
said segregation zone to be sufficiently great as to preserve the integrity of said segregation zone.

4,020,574

PIVOTED SCRAPER EJECTOR WITH HYDRAULIC MEANS TO PROVIDE LEVEL SPREAD

Ernest W. Wagner, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 7, 1976, Ser. No. 684,230
Int. Cl.² E02F *5/00, 9/28*
U.S. Cl. 37—126 AE **6 Claims**



1. In an earth-moving scraper having a scraper bowl with ground-engaging wheels at one end thereof and hydraulically operated bowl lift cylinders at the other end for raising and lowering said other end of said bowl and a floor ejector mounted on said bowl for pivotal movement about an axis transverse to said bowl, the improvement comprising:

signal-producing means operatively associated with said ejector floor for producing a signal during at least a portion of the pivotal movement of said ejector floor about its horizontal axis, said signal having a magnitude proportional to the magnitude of vertical distance of the forward edge of said ejector floor below the bottom of said scraper bowl;

signal-sensing means for sensing the magnitude of said signal; and

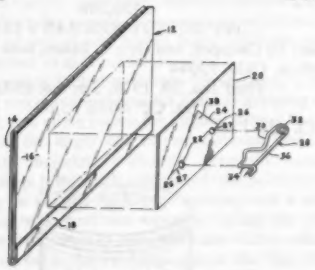
means operatively associated with said bowl lift cylinders and actuated by said signal-sensing means for operating said bowl lift cylinders to raise or lower said other end of said scraper bowl in response to, and in an amount proportional to, an increase or decrease respectively in the magnitude of said signal.

4,020,575

IDENTIFICATION BADGE

James Brompton Kruger, Oxford, and Karl Frederick Sonntag, Middlebury, both of Conn., assignors to Scovill Manufacturing Company, Waterbury, Conn.

Filed Feb. 4, 1976, Ser. No. 653,101
Int. Cl.² A44C *3/00*
U.S. Cl. 40—1.5 **2 Claims**



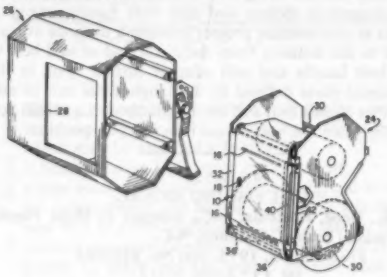
1. An identification badge comprising an envelope of transparent stiffly flexible sheet material including a front or display panel, two opposite edges of which are doubled back to present a pair of oppositely directly flaps, one of which is shorter than the other, the margin of the larger fitting releasably under the shorter; a wire safety-pin-like fastener comprising a base run having a spring hinge at one end and a catch at the other end, and a pin run extending out from the hinge; and a clamping panel also of transparent stiffly flexible sheet material and having a pair of spaced apertures, the clamping panel being formed with a V-shaped slit to define a tongue, the terminals of the rays of the V being outward from the apertures respectively and said terminals being connected respectively to the adjacent apertures by secondary slits, the said base run extending through the apertures so that the intermediate portion of the base run is on the envelope side of the clamping panel and the remainder of the fastener is on the opposite side of the clamping panel, the panel being sealed to the larger flap of the envelope in areas completely surrounding the base run, the areas including a portion of the tongue whereby the hold of the clamping panel on the fastener immobilizes the fastener with respect to the envelope, and no part of the fastener is disposed between the front part of the panel and the flaps.

4,020,576

CARRIER FOR THE PRESENTATION OF PAGES OF CONVENTIONAL READING MATERIAL

Herbert C. Dickey, North Reading, Mass., assignor to The Ealing Corporation, South Natick, Mass.

Filed May 28, 1975, Ser. No. 581,588
Int. Cl.² G09F *11/29*
U.S. Cl. 40—86 R **2 Claims**



1. A carrier adapted for receiving a scroll comprising a facing sheet and a backing sheet and a plurality of pockets disposed along its length and an unlaminated portion extending along at least on edge of said scroll, said scroll being adapted to be wound around a feed spool, said carrier comprising:

a. means for supporting a feed spool in said carrier and a take-up spool for taking up said scroll as it is unwound from said feed spool;

b. a facing portion disposed on said support means and positioned, configured and dimensioned to underlie said scroll as said scroll passes from said feed-spool to said take-up spool; and

c. means for guiding the insertion of pages into the scroll, said insertion means positioned adjacent said facing portion and positioned dimensioned and configured to be disposed over said backing sheet and between the unlaminated portion of said facing and backing sheets when said scroll is disposed over said facing portion.

4,020,577

BOLT HANDLE ADAPTOR FOR A BOLT ACTION RIFLE

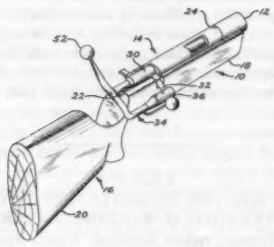
Joseph James Duffy, 411 Darwin Drive, Newark, Del. 19711

Filed Jan. 5, 1976, Ser. No. 646,420
Int. Cl.² F41C *11/00, 27/00*
U.S. Cl. 42—16 **7 Claims**

1. In a conventional right-hand operated bolt action rifle, having a chamber, a bolt for closing said chamber and a bolt handle attached to said bolt, a bolt handle adaptor for reloading of said rifle from the left side thereof, said bolt handle adaptor comprising:

mounting means attached to the distal end of the rifle's chamber closing bolt;

an adaptor having first and second ends, said adaptor being pivotally mounted to said mounting means intermediate its first and second ends, said adaptor further terminating in a gripping portion at its first distal end on the left side of the rifle and including a laterally projecting section immediate to its second end on the right side of the rifle;



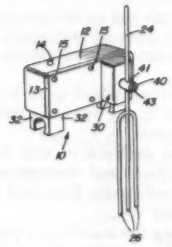
a bolt handle engaging means attched to said second end of said adaptor and engaged with the bolt handle of said rifle, said adaptor being further defined in that said laterally projecting section and said bolt handle engaging means in combination project laterally a distance at least equal to the distance from the distal end of said bolt to said bolt handle and said adaptor further lying in the horizontal plane defined by the longitudinal axis of said chamber closing bolt and the longitudinal axis of said bolt handle, when the bolt action is in its open position.

4,020,578

NIGHT FISHING SIGNAL

William K. Hope, Gastonia, N.C., assignor to Hope Plastics Corporation (Entire), Gastonia, N.C.

Filed Sept. 5, 1975, Ser. No. 610,892
Int. Cl.² A01K 97/12
U.S. Cl. 43—17 **2 Claims**



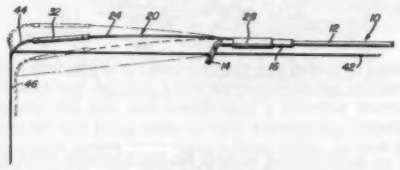
1. A night fishing signal device for signalling to a fisherman movement of the fishing line, a small, lightweight housing containing signal means for mounting on a fishing pole, an actuating means for contact with a fishing line to trigger the signal means, the actuating means including a lever having forked tines at one end thereof which is removably mounted on a miniature switch mounted on the housing, the housing being made from resilient plastic material and mounting brackets of similar material being attached to said housing to allow the device to be readily mounted in friction engagement with a fishing rod, and the signal means includes a solid state light emitting diode projecting from the housing, the housing containing transistorized circuitry for energizing the light emitting diode in an intermittent manner, further power source means for energizing the transistorized circuitry which need not be replaced for the entire life of the device, and the entire transistorized circuitry including the power source means being completely self-contained within the signal device housing.

4,020,579

BITE SIGNALLING ATTACHMENT FOR ICE FISHING POLE

Cleo E. Snider, Rte. 1, Penny Ave., Cedar Springs, Mich. 49319

Filed Feb. 17, 1976, Ser. No. 658,379
Int. Cl.² A01K 97/12
U.S. Cl. 43—17 **7 Claims**



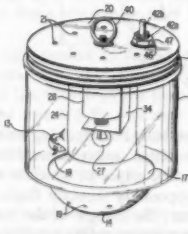
1. In combination with a fishing rod having a support sleeve mounted on its outer end, the outer end of said sleeve including a first transverse line guide eye directed laterally outwardly of one side of said rod, a bite signalling attachment comprising an elongated spring structure, one end of said spring structure being anchored to the other side of said rod closely inwardly of said eye and with said spring structure substantially paralleling said rod and projecting endwise outwardly of the outer end thereof, the outer end of said spring structure including means defining a second transverse line guide eye directed laterally of the side of said spring structure corresponding to said one side of said rod, said elongated spring structure being readily deflectable as a result of a lateral force being directed against the outer end thereof to bend said spring structure across the outer end of said rod outwardly thereof and into position with said second eye spaced substantially right angularly outwardly of said first eye on said one side of said rod, said sleeve defining a transversely enlarged end portion on said outer end of said rod, an elongated longitudinally slotted sleeve member whose slot is of greater width than the width of the outer end portion of said rod inwardly of said sleeve, said sleeve member being laterally engageable with said outer end portion and thereafter longitudinally snugly telescopingly engageable over said sleeve, said one end of said spring structur being anchored relative to said sleeve member.

4,020,580

COMPOSITE FISHERMAN'S LURE

Herman Eli Chappell, and Ocia L. Bettes, both of P.O. Box 42, Guthrie, Okla. 73044

Filed Jan. 20, 1976, Ser. No. 650,675
Int. Cl.² A01K 85/00
U.S. Cl. 43—17.5 **1 Claim**



1. A composite fishing lure comprising an outer transparent

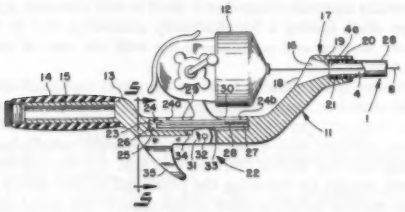
container adapted to receive live bait and having apertures therein to permit entry and exit of water, an inner transparent container concentric with the outer container and secured thereto, illuminating means within the inner container, insulating means to prevent entry of water to the inner container and control means for said illuminating means, said inner and and outer containers comprising jars of transparent material, each having a lid, the lid of the inner container being in contact with the lid of the outer container, said illuminating means comprising a blinker light and battery means therefor suspended within the inner jar, bracket means for supporting the battery and separate bracket means for supporting the blinker light, each bracket having a flat supporting portion parallel to the inner jar lid, the supporting portion of the light bracket being superimposed above the supporting portion of the battery bracket, gasket means separating the supporting portions of the lamp and battery brackets respectively and other gasket means interposed between the supporting portion of the light bracket and the under surface of the inner jar lid, and suspending means for said inner jar and battery and light brackets comprising a bolt having a threaded stem extending through the jar lids, brackets, and gaskets, and a ring nut engaging said bolt outside of said outer lid.

4,020,581

EYELESS FISHING ROD

Nunzio Genovese, 6703 Balsam Drive, Bedford Hts., OhioIO 44146

Filed Oct. 20, 1975, Ser. No. 623,671
Int. Cl.² A01K *87/00, 87/06*
U.S. Cl. 43—18 GF **10 Claims**



1. A fishing rod, comprising an elongated rod portion, a holder, and means for securing said rod portion to said holder portion;

said rod portion including a plurality of hollow, elongate, generally tapered cylindrical blanks connectable together to form a tube having a longitudinal central passageway therethrough, the larger end of each tapered blank being of a size to receive a partially inserted smaller end of a different blank for secure connection therebetween, the larger end of one of said blanks being relatively permanently fastened to said holder portion;

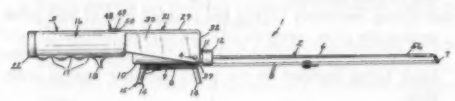
said holder portion including means for securing a reel to the fishing rod, handle means for manual grasping of the fishing rod, and guide means for guiding fishing line from the reel into the larger end of said fastened blank, said guide means including a smooth, generally truncated conical passage means through part of said holder portion and having an enlarged entrance opening and a smaller exit opening, said entrance opening facing the reel to receive line from reels of different sizes with a relatively minimum of frictional rubbing against the line by the passage walls thereof, and said exit opening facing said fastened blank and being at least approximately the same size as the size of the entrance to the hollow interior of said fastened blank at the larger end thereof to provide a relatively smooth transition from said guide means to said rod portion also with a relatively minimum of frictional rubbing against the line; said means for securing said rod portion to said holder portion including a generally cylindrical coupling opening in said holder portion, said coupling opening being aligned with said exit opening of said guide means and joining the latter at an annular shoulder, the thickness of said annular shoulder being at least approximately the same as the thickness of said fastened blank at the larger end thereof so as to provide a smooth transition from said guide means into the internal passageway of said fastened blank.

4,020,582

JIG FISHING APPARATUS

Rodney G. Thelen, Rte. 1, St. Cloud,, Minn. 56301

Continuation-in-part of Ser. No. 583,590, June 4, 1975, abandoned. This application July 29, 1976, Ser. No. 709,638
Int. Cl.² A01K *87/00*
U.S. Cl. 43—19.2 **6 Claims**



1. Fishing rod apparatus useful for jig fishing, comprising:

a. an elongated pole having a base end, and a free end to which may be attached a fishing line;

b. a handle having an interior compartment;

c. a base member located generally within said handle interior compartment and having a first end attached to the base end of said elongated rod, and a second end;

d. a pivot pin interconnecting said base member and said handle to allow pivotal motion of said base member thereabout, said pivot pin being located generally adjacent said base member first end;

e. switching means attached to said handle and selectively movable between an on and an off position for selectively turning on and off power from a power source;

f. electrical oscillating means operably attached between said base member and said handle for producing an oscillating movement in the free end of said elongated pole, said oscillating means being attachable to a power source and including:

i. an electromagnetic coil attached to said handle, said electromagnetic coil being energized only when power is supplied to it;

ii. a permanent magnet attached to said base member generally near the base member second end and being positioned generally adjacent said electromagnetic coil, said permanent magnet serving to repel and attract said base member second end toward and away from said electromagnetic coil when power is intermittently supplied to the electromagnetic coil;

iii. an impulse circuit breaker attached to said handle and having a switching element for intermittently controlling a supply of power to said electromagnetic coil as said switching element is activated, said switching element operably engaging said base member intermittently as the base member pivots toward and away from said switching element;

iv. electrical circuit means interconnecting said electromagnetic coil, said impulse circuit breaker and said switching means to provide intermittent power from a power source to said electromagnetic coil when said switching means are turned on; and

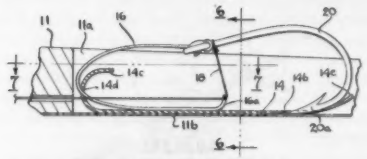
g. line storage means for storing fishing line generally adjacent said handle.

4,020,583

SNAG-PROOF FISHING LURE

Jennings B. Gatlyn, 1123 Viewmont Drive, Escondido, Calif. 92027

Filed Dec. 5, 1975, Ser. No. 638,039
Int. Cl.² A01K *85/02*
U.S. Cl. 43—42.41 **7 Claims**



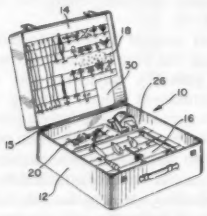
1. A snag-proof fishing lure comprising:
a plate member having an elongated slot formed therein,
a substantially U-shaped spring attached near one end thereof to said plate member,
a fish hook having a pointed end and a barbed portion adjacent to said pointed end, the end of said hook opposite the pointed end thereof being attached to the other end of said spring,
said spring resiliently urging the pointed end of said hook against the plate member with the barbed portion thereof in said slot, the pointed end and barbed portion of the hook being shielded by the plate member against snagging,
a fish line attached to said hook substantially at the juncture between the hook and the spring, and
means extending from the plate member for guiding said line whereby when said line is pulled, the pointed and barbed ends of the hook are drawn away from the plate member to a position for catching a fish, said last mentioned means comprising a tab extending from said plate member at a position substantially opposite the attachment point of the line to the hook, said tab having an aperture formed therein through which the line runs.

4,020,584

MAGNETIC FLOATING FISHING TACKLE BOX

Dorothy Hamilton Michal, 14544 Cleveland Ave., Posen, Ill. 60469

Filed Dec. 8, 1975, Ser. No. 638,649
Int. Cl.² A01K *97/06*
U.S. Cl. 43—57.5 R **1 Claim**



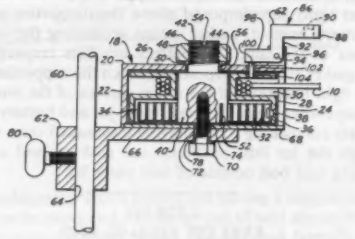
1. A fishing tackle box comprising in combination a bottom shell and a cover shell hingedly connected together, preformed blocks of buoyant plastic material fitted within each shell to provide floatability to the box, spaced magnetized strips molded in said buoyant blocks to hold fish hooks and lines thereto magnetically, said buoyant material in said shells each having a well therein opposite each other for carrying a reel or the like therein, said buoyant material in the bottom shell having a series of smaller compartments formed therein along one wall thereof for carrying non-magnetic fishing material therein, and a removable cover frictionally held over the smaller compartments to hold the contents thereof in place.

4,020,585

ANIMAL TRAPPING APPARATUS

Melvin D. Benschoter, Birch Creek Forest, Rt. No. 1, Somerville, Tex. 77879

Continuation of Ser. No. 571,603, April 25, 1975, abandoned. This application July 23, 1976, Ser. No. 708,040
Int. Cl.² A01M *23/24*
U.S. Cl. 43—96 **3 Claims**



1. An inexpensive, humanitarian trapping system comprising:
a jaw trap assembly including animal actuating means therefor,
a spring motor housing having an annular chamber therein,
a generally centrally located stub shaft in said chamber, said stub shaft having a longitudinally extending slot in its outer surface and communicating with the end of said stub shaft,
an annular spool slidable endwise over said stub shaft into said chamber, a stiff coil spring strong enough to pull said jaw trap with an animal therein along the bottom of a body of water, said spring having a generally radially bent inner end for sliding endwise into said slot in said stub shaft, means for fastening the outer end of said spring to said annular spool, a tether coiled around said spool, said housing having a tether opening through which said tether uncoils generally tangentially,
latch means for restraining the recoil of said spool, said latch means having a portion that is positioned generally to one side of said opening in said housing when latching said spool against recoil and being generally over said opening when unlatching said spool, said tether being slidably retained by said latch portion and being connected to said jaw trap, and whereby said stiff coil spring can be slid axially into its assembled position and an animal that is caught in said jaw trap and who pulls on said tether to unlatch said spool can be dragged from shallow water to deeper water and automatically drowned by the weight of the jaw trap.

4,020,586

DOLL WITH ENVELOPE FOR PHOTO IMAGE FACE, AND HAIR CONCEALING ENVELOPE OPENING

Dorothy Benner, South Miami, Fla., assignor to Picture Doll Company, Miami, Fla.

Continuation-in-part of Ser. No. 542,514, Jan. 17, 1975, abandoned. This application Nov. 11, 1975, Ser. No. 631,173
Int. Cl.² A63H *3/36*
U.S. Cl. 46—164 **7 Claims**

1. A toy doll comprising
a. a body portion; and
b. a head portion, said head portion including
i. a face portion,
ii. a protective plastic, transparent film attached along its side and bottom edges only to said face portion to

define a photo receiving envelope, the unattached upper edge of said film cooperating with said face portion to define a photo entry slot for said envelope, whereby a photographic image may be easily disposed in said envelope and protected therein; and

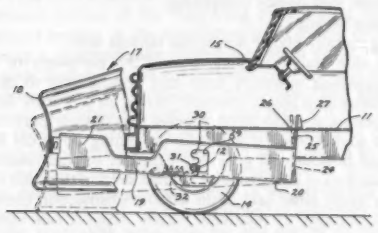
iii. a mass of hair-like material disposed on said head portion and concealing said upper edge of said transparent film, the portion of said hair-like material concealing said upper edge being attached to the exterior surface of said film along said upper edge thereof.

4,020,587

TOY VEHICLE PLOW MOUNTING

Gerald A. Cuhel, Silver Lake, Minn., assignor to Tonka Corporation, Hopkins, Minn.

Filed Feb. 4, 1976, Ser. No. 655,099
Int. Cl.² A63H *17/05*
U.S. Cl. 46—202 **3 Claims**



1. In a miniature toy vehicle having a chassis supported by a front wheel axle, a plow mounted to extend transversely across the front of the vehicle and including,

a. a bracket disposed under the chassis and having a front portion extending forwardly beyond the chassis,

b. the rear end of said bracket having a fore and aft sliding hinge connection to the chassis on an axis to the rear of but parallel to the front wheel axle,

c. a plow blade mounted on the front portion of the bracket,

d. said bracket having vertically spaced notches engageable with said front wheel axle to support the blade in different selected positions of elevation, and

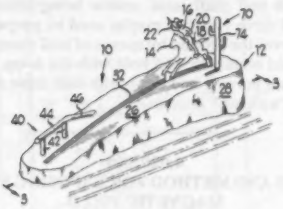
e. spring means acting between the chassis and bracket to yieldably retain the axle in engagement with any selected notch in the bracket.

4,020,588

ACTION ACCESSORY FOR USE WITH TRAVELLING TOY

Gordon A. Barlow, Skokie, and Donald F. Nix, Hanover Park, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Sept. 15, 1975, Ser. No. 613,296
Int. Cl.² A63H *11/10, 15/00*
U.S. Cl. 46—216 **6 Claims**



1. An accessory for use with a travelling toy, such as a model train, or the like, comprising:

a frame having an inclined vertically undulated ramp portion defining a path of travel;

a first figure toy in the form of a horse supportable by wheel means thereon for movement along said path of travel from the top toward the bottom of the inclined undulated ramp;

a second figure toy in the form of a rider removably mountable upon said first figure top;

dismounting means on the frame at a stationary position along said inclined undulated ramp for engaging the rider toy as the horse passes the dismounting means whereby placement of the accessory adjacent the path of travel of the travelling toy permits a user to start the movement of the horse figure toy and mounted rider figure toy to travel down the inclined undulated ramp in a timed relationship so that the dismounting means causes the rider figure toy to alight from the horse figure toy onto the passing travelling toy; and

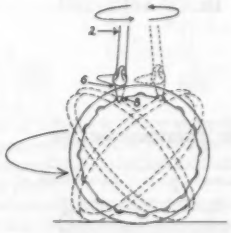
release means at the top of said inclined undulated ramp for engaging the horse figure toy to initiate movement thereof from a starting position down the inclined undulated ramp.

4,020,589

HOOP AND DEVICE FOR "WALKING" SAME

Benjamin M. Bravence, 11601 Lenher Schwerin Trail, Tucson, Ariz. 85715, and Maurice D. Wilson, 323 N. Norris, Tucson, Ariz. 85719

Filed Oct. 14, 1975, Ser. No. 621,962
Int. Cl.² A63H *33/02*
U.S. Cl. 46—220 **1 Claim**



1. A toy comprising a generally circular hoop having a generally V-shaped groove about its entire periphery, the sides of the V-shape diverging in a direction radially outwardly of

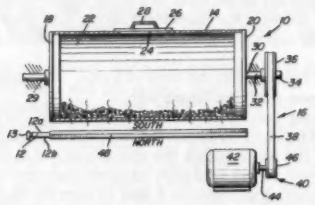
said hoop to form edges on which said hoop may stand or roll on a supporting surface, the center of said groove having at least one hole therein through said periphery; a drive member comprising an elongated shaft having a handle at one end and a cross member joined thereto at the other end, said cross member extending transversely of the length of said shaft and having means thereon for coacting with the edges of said hole for maneuvering said hoop, said means comprising at least one nodule projecting from said cross member generally in the direction in which said shaft extends and at a location opposite the joint with said shaft, said nodule being relatively short, whereby said drive member maybe used to propel said hoop by rolling it over the ground by means of said cross member or by placing said nodule in said hole with the hoop standing on the ground and moving said hoop with said drive member in a spinning or "walking" maneuver.

4,020,590

APPARATUS AND METHOD FOR EXPOSING SEEDS TO A MAGNETIC FIELD

Albert Roy Davis, Green Cove Springs, Fla., assignor to Bio-Magnetics International Inc., Jacksonville, Fla.

Filed Dec. 15, 1975, Ser. No. 640,931
Int. Cl.² A01C *1/00*; A01G *7/04*
U.S. Cl. 47—1.3 **18 Claims**



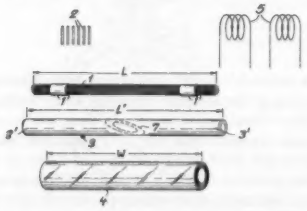
1. Apparatus for magnetically treating seeds comprising:
a. a magnet for producing a unipolar magnetic field;
b. a housing spaced from said magnet and within said field, said housing including a closable access opening therein for receiving said seeds and for retaining them within said unipolar magnetic field;
c. drive means operatively associated with said housing for imparting only rotary motion to said housing for causing said seeds to roll and tumble within said housing, said rolling and tumbling comprising the only movement of said seeds relative to said unipolar magnetic field.

4,020,591

PACKAGED TUNNEL-TYPE GREENHOUSE FOR ROW CROP

Jouke Seffinga, Rotbuchstrasse 46, Dubendorf, Switzerland (CH-8600), and Andreas Meyer, Rooswies, Wangen, Switzerland (CH-8602)

Filed July 17, 1975, Ser. No. 596,625
Int. Cl.² A01G *13/02*
U.S. Cl. 47—28 R **3 Claims**



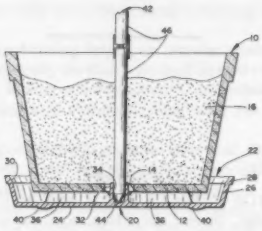
1. A packaged greenhouse comprising:
a rigid and elongated core tube formed with a central weakened region for subdivision of said tube into a pair of like stakes;
an elongated synthetic-resin foil wound on said core tube so as to leave at least one of the ends thereof uncovered;
a predetermined even number of deformable metal wire wicket halves in said core tube and each having a length equal to substantially half the rectified length of a greenhouse support wicket;
a number of short sleeves equal to half the number of said wicket halves and each dimensioned so as to receive snugly the ends of two such wicket halves;
a coil of string wound around said core tube at the uncovered end thereof; and
a mailing tube containing said short sleeves and said core tube containing said wicket halves and with said foil and string wound thereon, said core tube having a longitudinal axis and said weakened region lying in a plane inclined to the longitudinal axis of said core tube.

4,020,592

COMBINED PLANTER RECEPTACLE AND PLANT SUPPORT

Carl A. Saunders, Fort Madison, Iowa, assignor to Cardic and Company, Fort Madison, Iowa

Filed Jan. 8, 1976, Ser. No. 647,570
Int. Cl.² A01G *9/04*, *9/12*
U.S. Cl. 47—71 **6 Claims**



1. A plant husbandry device for use in combination with a planter having a bottom portion terminating in a substantially planar lower surface which is provided with a centrally disposed drain, said device comprising
A. a base having
i. a generally planar horizontal bottom wall,
ii. a side wall extending around the periphery of and projecting upwardly from said bottom wall to define therewith a liquid reservoir having an upwardly facing opening sized to freely receive said bottom portion,
iii. a socket integral with and projecting upwardly from said bottom wall generally centrally of said reservoir, said socket being smaller in cross section than and sized to freely enter said drain without obstruction thereof,
iv. a plurality of relatively narrow support ribs integral with and reinforcing said bottom wall and projecting upwardly therefrom to a height less than that of said socket, the inner end of each of said ribs being reduced in height relative to the outer ends and integrally connected to and buttressing said socket, said ribs being spaced from one another radially around said socket and the outer ends of said rib terminating in coplanar upper edge surfaces radially spaced from said socket which cooperatively form a generally horizontal discontinuous seat and said inner ends forming a relieved portion under said planter drain.
B. when said bottom portion of said planter is disposed within said reservoir
i. said seat receiving and supporting said bottom surface in a spaced relation with said bottom wall without obstruction of said drain,
ii. said socket entering said drain, and

iii. the interior of said planter freely communicating with said reservoir through said drain externally of said socket between said ribs,

C. a manually extendable elongate plant support aligned with said socket and extending through said planter in a generally perpendicular relationship with said bottom wall,

D. means for releasably connecting said socket and said plant support and restraining said plant support against tilting from its said perpendicular position under the influence of transversely applied pressure thereon.

4,020,593

WINDOW WINDING APPARATUS FOR VERTICALLY DIVIDED AUTOMOBILE SLIDING WINDOW PANES

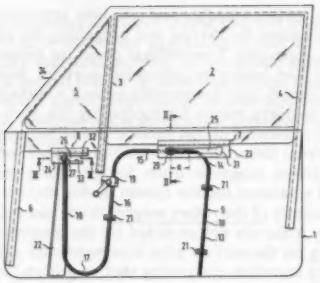
Horst Salomon, Meerholz, and Herbert Kouth, Schoneck, both of Germany, assignors to Rockwell-Golde, GmbH, Frankfurt, Germany

Filed Feb. 6, 1976, Ser. No. 655,690

Claims priority, application Germany, Feb. 24, 1975, 2507893

Int. Cl.² E05F *5/12*

U.S. Cl. 49—103 **9 Claims**



1. Winding apparatus for a window assembly of a vehicle such as an automobile or the like wherein the assembly includes a window which is slidable generally upwardly-downwardly in an opening and closing action and the window assembly includes a relatively small ventilating pane and a larger viewing pane actuated by a common drive adapted to produce advance motion of the ventilating pane during opening and delayed motion of the ventilating pane during closing, comprising a longitudinally slotted elongated guide tube with a flexible threaded cable guided slidably in the tube in a tension and compression transmitting relationship, two spaced apart drivers extending through the guide tube slot and secured to the threaded cable, one of the drivers being in continuous engagement with the viewing pane and adapted to undergo a lost motion which retains the viewing pane in its closed position during opening advancement of the ventilating pane, and the other of the drivers being adapted to automatically couple to the ventilating pane only for and during its opening and closing motion.

4,020,594

LEVERLESS DOOR MECHANISM

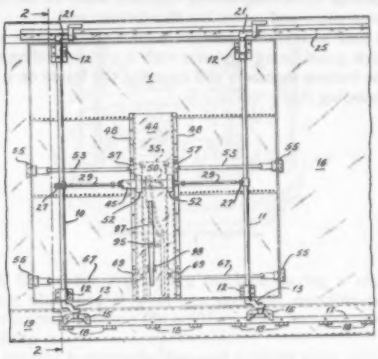
Alfons W. Ceyer, Berwyn, Ill., assignor to Evans Products Company, Portland, Oreg.

Filed Aug. 6, 1975, Ser. No. 662,284

Int. Cl.² E05D *15/10*

U.S. Cl. 49—220 **23 Claims**

1. In a plug door structure for a railway house car side wall opening, upright door operating shafts journaled on the door each having a crank arm at its lower end for supporting the door on a carriage movable along the wall, a shaft-rotating crank on each shaft spaced from its support arm, structure mounted for vertical movement parallel to the door and including a non-circular generally vertically oriented cam at least in part inclined from the vertical, follower means for said cam, means restricting said follower means to horizontal movement parallel to the door, an operating bar for each shaft horizontally aligned with said follower means and having one end connected thereto with its other end pivotally connected to said shaft-rotating crank whereby upon vertical movement of said structure said follower means and said operating bars



are moved horizontally generally parallel to the door, rotating said cranks and causing said shafts to rotate and shift the door transversely of the wall, and means for selectively imparting vertical movement to said vertically movable structure, said vertical movement imparting means comprising rack means mounted on said vertically movable structure, pinion means journaled on the door and meshing with said rack means, and means for rotating said pinion means.

4,020,595

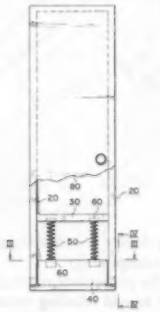
DOOR OF ADJUSTABLE HEIGHT

James E. Duncan, New York, N.Y., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Mar. 17, 1976, Ser. No. 667,475

Int. Cl.² E06B *7/20*

U.S. Cl. 49—306 **1 Claim**



1. A door of adjustable height comprising:

A U-shaped vertical frame with a horizontal top piece and two like parallel vertical legs extending downwardly from the top piece;

a first horizontally extending cross piece coplanar with the frame and disposed between and secured to both legs adjacent but above the bottom ends of the legs;

a second cross piece disposed between the legs adjacent the bottom ends thereof and parallel to the first cross piece, the second cross piece being vertically movable up and

down in the plane of the frame toward and away from the first cross piece;

first and second vertical parallel compression springs disposed within the frame between the first and second cross pieces, the springs being secured at upper ends to the first cross piece and at lower ends to the second cross piece;

first and second horizontally elongated bottom members secured to corresponding opposite sides of the second cross piece and extending therebelow; and

first and second flat parallel vertical rectangular panels, each panel being coplanar with a corresponding one of the bottom members and covering the frame on a corresponding side.

4,020,596

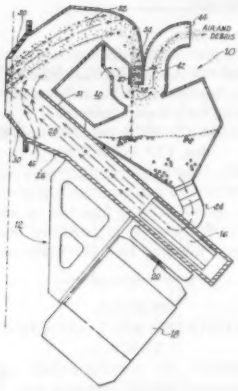
CONVERTIBLE BLAST CLEANING UNIT

John C. Bergh, Elkhart, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Continuation of Ser. No. 522,464, Nov. 11, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,590

Int. Cl.² B24C *9/00*

U.S. Cl. 51—9 M **9 Claims**



1. A blast cleaning device for treating generally vertical and horizontal surfaces, comprising:

a. blasting means for projecting particulate at high velocity;

a. hopper attached to said blasting means supplying particulate thereto; and

c. two module means alternately attachable to said blasting means, one of which is always attached to said device, each module means having a different directionally oriented opening therein for defining a blast area for treatment of said vertical and said horizontal surfaces, said module means including:

i. means for recyclying spent particulate to said hopper for reuse, and

ii. means for separating the spent particulate from debris generated by said surface treatment prior to returning the particulate to said hopper.

4,020,597

MOBILE SURFACE CLEANING AND POLISHING APPARATUS

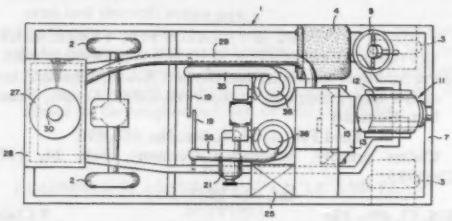
Genshichi Shigyo, and Takuji Nishio, both of Tokyo, Japan, assignors to Magstar Engineering Co., Ltd., Japan

Filed Apr. 22, 1975, Ser. No. 571,001

Claims priority, application Japan, Oct. 25, 1974, 49-123055

Int. Cl.² B24C *3/06*

U.S. Cl. 51—9 M **2 Claims**



1. A mobile surface cleaning and polishing apparatus comprising, a mechanism for driving and propelling the cleaning and polishing apparatus, a centrifugal projector mounted on the apparatus and having an elongated port for projecting therethrough shot or grit downwardly against a surface to be treated, and recovery means for recovering the shot or grit projected and remaining on the surface and all surface material removed from the surface, said recovery means consisting of a rotary driven magnetic drum for attracting magnetic materials and a vacuum suction system having suction means situated rearwardly of the rotary magnet drum and means for collecting any materials not attracted by the magnetic drum and remaining on the surface after treatment with said shot, said remaining materials comprising shot or grit and material removed from said surface by treatment thereof, a hopper, a turn-table rotatably mounting said centrifugal projector to selectively turn horizontally said projector for varying the effective length of said port thereby to vary the width of the surface treated, a scavenging pump, a bag filter, an air duct system having ducts connecting said pump and said filter, a bucket conveyor transmitting used grit or shot and foreign matter to said hopper, and conduit means for connecting said centrifugal projector to said hopper.

4,020,598

METHOD OF MEASURING THE RADIUS OF A ROTATING GRINDING WHEEL AND DEVICE THEREFOR

Michel Engineer Harmant, Neris-les-Bains, France, assignor to Etablissements Zelant Gazuit, France

Filed Dec. 5, 1975, Ser. No. 638,055

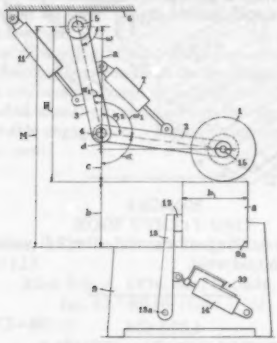
Claims priority, application France, Dec. 6, 1974, 74.40088

Int. Cl.² B24B *7/02, 49/00*

U.S. Cl. 51—34 R **14 Claims**

4. Device for measuring the radius of a grinding wheel while said grinding wheel is moved back and forth across one face of a workpiece having a generally rectangular or square cross section of predetermined dimensions, said workpiece being supported by a generally flat support surface, said grinding wheel being supported by at least one pivoting arm of predetermined length and urged against said workpiece, said pivoting arm being pivoted at a point spaced a predetermined distance from said flat support surface, comprising first means for measuring the value of the angle formed between said pivoting arm and a predetermined fixed direction and for generating an electric signal in relation to the measured angle value, second means for generating predetermined electric signals corresponding to the predetermined dimensions of the workpiece, to the predetermined length of said at least one

pivoting arm and to said predetermined distance, respectively, a first computer for treating said electric signal and said predetermined electric signals for generating therefrom an electric signal proportional to the radius of said grinding wheel, third means for generating a first control signal each time said grinding wheel assumes a predetermined position during its



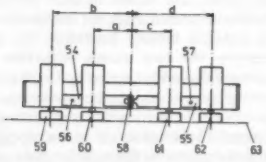
back and fourth movement across said one face of said workpiece, fourth means for generating a second control signal indicating that said grinding wheel is into engagement with said one face of said workpiece, and storage means for storing said electric signal proportional to the radius of the grinding wheel in response to the presence of both said first and second control signals.

4,020,599

ABRADING ARRANGEMENT FOR A RAILWAY TRACK

Romolo Panetti, Speno International S. A. and Frank Speno, Railroad Ballast Cleaning Co., Inc., both of Geneva, Switzerland

Filed May 18, 1976, Ser. No. 687,606
Claims priority, application Switzerland, May 21, 1975, 006522/75
Int. Cl.² B24B *23/00*
U.S. Cl. 51—178 7 Claims



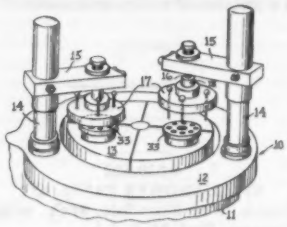
1. An arrangement for truing the bearing surface of a railway track by moving a series of contact elements one behind the other tangentially of the bearing surface of a laid rail of a railway track, said elements comprising two groups of two contact elements, means for moving one of said contact elements away from the rail when the other moves towards the rail, two inclinable beams, each of said two groups being mounted on one inclinable beam, means interconnecting said two beams so that a change in the inclination of one of the beams changes the inclination of the other beam, said elements of the two groups being always tangential to the radius of curvature of the rail, said radius of curvature including negative and positive radii of curvature and a straight line.

4,020,600

POLISHING FIXTURE

Lawrence Day, Mount Prospect, Ill., assignor to Spitfire Tool & Machine Co., Inc., Chicago, Ill.

Filed Aug. 13, 1976, Ser. No. 714,183
Int. Cl.² B24B *37/04*
U.S. Cl. 51—237 R 9 Claims



1. A fixture for a polishing machine having a rotatable polishing plate and at least one vertically movable vertical spindle supported above the polishing plate, the improvement comprising

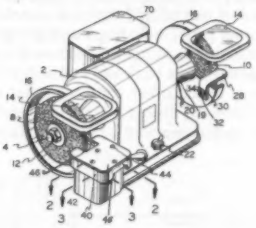
a. a circular horizontally disposed pressure plate carried by and movable vertically with the spindle,
b. means connecting the spindle centrally of said pressure plate,
c. a circular workpiece-carrying head having a diameter less than that of said pressure plate positionable upon the rotatable polishing plate beneath and partially beyond the periphery of said pressure plate,
d. means depending from said pressure plate for engaging said head as said pressure plate is moved vertically in the direction of said polishing plate, and
e. cooperating means carried centrally of said head to freely receive said engaging means so as to position said head on said polishing plate under pressure.

4,020,601

GRINDER WITH WEAR COMPENSATING TOOL REST

Robert C. Gray, 280 Clifford St., Blackfoot, Idaho 83221

Filed July 7, 1975, Ser. No. 593,330
Int. Cl.² B24B *41/06*
U.S. Cl. 51—238 R 8 Claims



1. A grinding wheel device comprising:

a. a base support member,
b. a grinding wheel rotatably mounted to said base support member,
c. a electrical power means for rotating said grinding wheel,
d. a tool rest housing having a slidable top tool rest member held thereto, said tool rest housing being stationarily fixed to said base support member,
e. a photoelectric sensing and signal emitting means contained within said slidable top tool rest member for continually detecting the distance that said slidable top tool rest member is from said grinding wheel,

f. a means for moving said slidable top tool rest member towards said grinding wheel in response to the signal emitted by said photoelectric sensing and signal emitting means whenever the distance between said grinding wheel and said slidable top tool rest member exceeds a predetermined maximum limit and

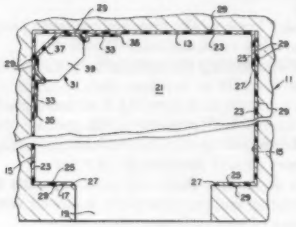
g. a means for automatically disconnecting said electrical power means whenever said grinding wheel becomes worn to a preselected minimum diameter.

4,020,602

STALL SHOWER PANEL KIT

Phillip D. Daniels, West Bloomfield, Mich., assignor to Novi Plastics Company, Novi, Mich.

Filed Apr. 5, 1976, Ser. No. 673,739
Int. Cl.² A47K *3/16*
U.S. Cl. 52—35 **5 Claims**



1. In a stall shower having a back wall, end walls and a pair of aligned inwardly directed spaced apart front walls; a plurality of flat, rectangular panels respectively mounted over said back and end walls, each panel having an upright right angular end flange terminating in an elongated outturned lip;

a pair of said panels bearing against and superimposed over and secured to said end walls, with their corresponding flange bearing against and substantially covering and secured to the corresponding front walls;

the third panel bearing against and overlying said back wall, with its flange overlying, bearing against and secured to the free end of one of said end wall panels; and

an upright corner panel including a pair of right angular side plates terminating in elongated outturned lips, said corner panel projected into a back and end wall corner overlying the free ends of the other end wall panel and back wall panel and secured thereto, said lips sealingly bearing against the underlying wall or panel surface.

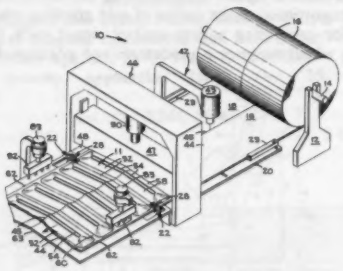
4,020,603

ROOF FOR RAILWAY CAR

Robert J. Austill, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Oct. 2, 1975, Ser. No. 618,851
Int. Cl.² E04C *2/32*; B61D *17/12*
U.S. Cl. 52—53 **8 Claims**

1. A unitary railway car roof for covering the entire cargo space of a railway car comprising two elongated webs extending the full length of the cargo space and cooperatively forming a symmetrical gable in cross section, a continuous weld joining said webs along the crest of said gable, and a plurality of longitudinally spaced stiffening panels integrally stamped in



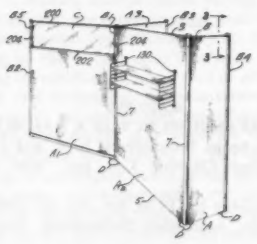
said webs and extending substantially the full width of said roof and through said weld.

4,020,604

DIVIDER SCREEN ASSEMBLY

George Legler, Kirkland, Canada; Hans Hostettler, Plattsburgh, N.Y.; Jean-Pierre Lacoste, Montreal, and Friedrich Schwab, Montreal North, both of Canada, assignors to Precision Mfg. Inc. - Fabrication, St. Laurent, Canada

Filed Aug. 18, 1975, Ser. No. 605,524
Claims priority, application Canada, Nov. 20, 1974, 214213
Int. Cl.² E04B *1/346*
U.S. Cl. 52—65 **13 Claims**



1. A space dividing assembly comprising at least two space dividing panels, each panel having end edges and top and bottom edges, means in each panel at the bottom edge for use in supporting the panel, and means in each panel at the top and bottom of at least one end edge for use in connecting the panel to another panel, a tubular post unit, the tubular post unit located between the two panels with the connecting means on each panel releasably connected to the tubular post unit, the connecting means urging the panels snugly against the tubular post unit, the means for supporting the panel permitting the panel to be situated in an upright position before connecting the panel to the tubular post unit, thereby facilitating erection and dismantling thereof, and wherein the means for use in connecting each panel to another panel comprise a pair of brackets, one bracket attached to the bottom edge, the other bracket attached to the top edge, both brackets projecting slightly past the one end edge and having an upturned end,

and wherein the tubular post unit comprises a tubular member, a cap threadably connected to the top end of the tubular member, the cap having an annular groove in its bottom surface facing the top of the tubular member, the upturned end of the one bracket extending up into the tubular member from the bottom end of the tubular member, the upturned end of the other bracket extending over the top end of the tubular member and up into the groove in the cap,

a symmetrical body having a disc-like base terminating in a circular edge,

a frusto-conical boss protruding centrally from said base and tapering inwards from a root to a thinner tip,

an annular flange protruding from the edge of the base at a position spaced from the root of the boss and having an outside cylindrical face forming a continuation of said base and an inside frusto-conical face sloping outwards from the base,

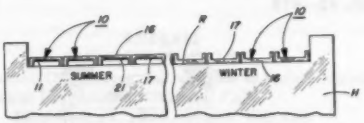
the boss protruding beyond the flange and the flange and boss forming between them the annular groove for receiving a connecting flange of a panel bracket, and

a threaded shank protruding from the tip of the boss for screwable engagement with a securing member on the top of the post.

4,020,605
ROOF UTILITY UNIT

Steven Zenos, 1520 Sagebrush Trail, SE., Albuquerque, N. Mex. 87123

Filed Feb. 9, 1976, Ser. No. 656,430
Int. Cl.² E04B *1/346, 1/38*
U.S. Cl. 52—66 **15 Claims**



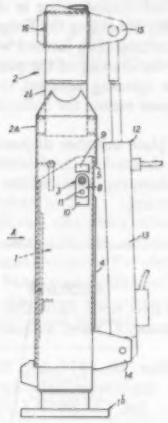
1. A reversible, all seasonal roof utility unit adapted to be placed in juxtaposition with other like units in covering a substantial portion of a roof, said unit comprising a substantially horizontally disposed sheet member having a light-absorbing color on one side and light-reflecting color on the opposite side, and elevating means adapted to elevate said sheet member with respect to the roof to form an air space therebetween, said sheet member being adapted for reversible positioning in substantially a horizontal plane with respect to said roof, whereby the light-absorbing colored side is directed away from said roof during the colder seasons, and the light-reflecting colored side is directed away from said roof during the warmer seasons.

4,020,606
STREET LIGHTING COLUMNS

John William Pratt, Goosedale Farm, Bestwood Park, Nottingham, England

Filed Oct. 29, 1975, Ser. No. 626,635
Int. Cl.² E04H *12/34*
U.S. Cl. 52—116 **8 Claims**

1. A street lighting column comprising a base section, an upper section normally supported upright by said base section but movable vertically between its normal supported position and a raised position in which it is free to pivot relative to said base section, a hinge connection between said sections permitting said vertical and pivotal movements, a raising and lowering mechanism for effecting said vertical and pivotal movements so as to move said upper section from a normal upright position to a lower pivoted position within reach from the ground, said raising and lowering mechanism comprising a fluid powered double-acting piston and cylinder unit connected between the common sections and which is operable in a first direction to lift said upper section vertically to said raised position in which it is free to pivot relative to the base section, said hinge including a support plate which is turnable between a normal position in which it permits the upper column section to stand in its normal upright non-pivotable position and a position in which it cooperates with a lug on one of said column sections to support the upper section in its raised pivotable position, the piston and cylinder unit being operable in its other direction to automatically pivot said upper section, supported by said support plate in its raised pivotable position, about said hinge and thus lower said upper section to within reach from the ground, whereby, starting from the normal upright position of said upper section and with said support plate in its said normal position, said piston and cylinder unit can be powered in its first direction to raise said upper section vertically to its raised pivotable position, said support plate can then be turned to cooperate with said lug to support said

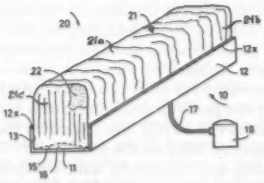


upper section in its raised pivotable position, said piston and cylinder unit can then be reversed to its other direction to pivot said upper section automatically about said hinge, then said piston and cylinder unit can be powered again in its first direction to pivot said upper section reversely to its upright position, said support plate can be turned to its normal position, and said upper section can be vertically lowered by said piston and cylinder unit to its normal upright supported position.

4,020,607
SEALING DEVICE

Leon Hans-Hother Bjervig, Osterbyhirst Madum DK-6990, Ulfborg, Denmark

Continuation-in-part of Ser. No. 460,239, April 11, 1974, abandoned. This application Oct. 29, 1975, Ser. No. 626,944
Int. Cl.² E06B *7/23*
U.S. Cl. 52—173 DS **5 Claims**



1. A closure assembly for sealing the space between a door opening and the open rear end of a vehicle positioned adjacent the door opening and comprising a frame structure intermediate the vehicle and the door opening and a sealing device mounted on the frame structure adjacent the rear end of the vehicle and comprising:

a. a rigid, elongated fastening member constituted by an angular profile having flanges defining an open channel-shaped space therebetween;

b. a collapsible, elongated sealing member constituted by an elongated pad structure having an air-tight, flexible wall

defining a casing and a collapsible resilient material enclosed therein to hold the pad structure distended, the sealing member being mounted within the channel-shaped space in the fastening member and extending outwardly therefrom beyond said channel-shaped space;

c. vacuum means connected to the channel-shaped space in the fastening member and communicating with the interior of the pad structure, the vacuum means being operable to apply vacuum to the pad structure to collapse the pad structure and cause the same to be wholly retracted into the channel-shaped space in the fastening member;

d. clamping bolts connecting the fastening member with the frame structure and each formed with a channel communicating with the interior of the pad structure and with at least one side opening adapted to connect the channel with the vacuum means for collapsing the pad structure; and

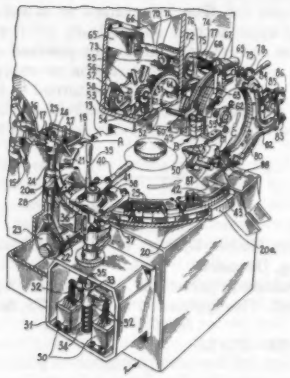
e. a perforated plate member disposed within the channel-shaped space defined by the fastening member and intermediate the clamping bolts and the interior of the collapsible pad structure.

4,020,608

WRAPPING AND SEALING MACHINE

Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Filed Mar. 20, 1975, Ser. No. 560,139
Claims priority, application Italy, Apr. 17, 1974, 3361/74
Int. Cl.² B65B *11/32*
U.S. Cl. 53—234 **4 Claims**



4. A wrapping and sealing machine, comprising;

a. an intermittently movable wrapping assembly for wrapping plastic products, each having a parallelepiped shape, in wraps each defined by sheet-like material wrapped about four consecutive sides of te respective product, the wrap having end portions thereof mutually superposed on one of the sides and having tabs folded on the two other, mutually opposite sides on the product;

b. a first sealing and conveying unit, comprising: a disk movable in intermittent rotary steps synchronically with the wrapping assembly and having circumferential pockets, each disposed to be brought into a product-receiving station by one of the rotary steps to receive one of the products with the mutually superposed wrap portions exposed on a side of the disk, the disk having, in each pocket, two end walls approximately radial of the disk and interconnected circumferentially of the disk and each pocket having open sides, on parallel sides of the disk, the unit also having, in overlying relationship with consecutive, circumferential segments of the disk, a heat-welding plate for weld-sealing the mutually superposed wrap portions, and a cooling plate for cooling the heat-welded, weld-sealed wrap portions; and

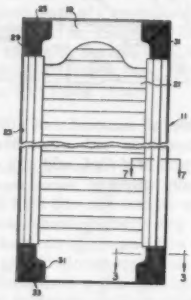
c. a second sealing and conveying unit, comprising, a generally similar disk having heat-welding and cooling plates disposed respectively to heat-weld the folded tabs and to cool the heat-welded tabs, the second unit also having means for discharging the wrapped products with heat-welded portions and tabs thereon, the disk of the second unit being normal to the disk of the first unit and the two disks being disposed to intersect one another at a location remote from the heat-welding and cooling plate by having one of the pockets of one of the disks coincide with one of the pockets of the other disk upon each intermittent rotary step for directly transferring a wrapped product with the heat-welded and cooled wrap portions thereof to the second unit for the heat-welding and cooling of the folded tabs.

4,020,609

SHUTTER CONSTRUCTION

Phillip D. Daniels, West Bloomfield, Mich., assignor to Novi Plastics Company, Novi, Mich.

Filed Mar. 24, 1976, Ser. No. 669,996
Int. Cl.² E06B *7/08*
U.S. Cl. 52—473 **4 Claims**



1. In a louvered shutter of molded plastic material adapted for registry with a building wall, the shutter being essentially a shell comprised of a generally planar body including louvers and a continuous peripheral flange; the improvement comprising:

a corner reinforcing and mounting block nested within each of the internal corners of the shutter at its sides adjacent said flange and secured to said body;

said corner block being essentially cup-shaped and having a body with an open-ended honeycombed base and a peripheral flange;

the honeycomb structure of the corner block base defining a grid of apertures extending essentially perpendicular to the plane of the body and being sized to receive a conventionally sized fastener, such as a nail or screw, to facilitate securement of the shutter to a building wall; and

the corner block providing reinforcement for the shutter.

4,020,610

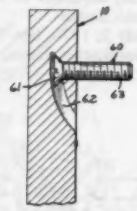
ANCHOR FOR STONE BUILDING MEMBER

Thomas E. Alexander, Cold Spring, Minn., assignor to Cold Spring Granite Company, Cold Spring, Minn.

Filed Jan. 10, 1975, Ser. No. 540,246
Int. Cl.² E04C *1/40*
U.S. Cl. 52—511 **4 Claims**

1. As an article of manufacture for use with a generally elongated fastening pin device, a slab of generally rigid natural stone having a flat surface and an arcuate slot extending obliquely through said surface for fixedly receiving an elongated fastening pin device therein, the center of the arc lying

outside of the slab and the bottom of the slot being wider than the top thereof, said arcuate slot having generally parallel opposed walls each of which has an outwardly extending



bottom portion and each of which intersects the slab surface to define an elongated opening in the flat surface with generally constant width along the length.

4,020,611

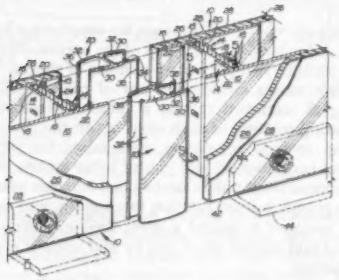
WALL ASSEMBLY

Alvin C. Amos, Orwigsburg, Pa., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Nov. 19, 1975, Ser. No. 633,181

Int. Cl.² E04B *1/62, 2/00*

U.S. Cl. 52—584 **14 Claims**



1. In a demountable wall assembly of the type described, the combination of a pair of composite and adjacent wall panels each of which is provided with an insulating core and opposed stiffened side marginal edges, said marginal edges being fitted with opposed inside and outside metallic rail members, a tongue-like bead element on at least one of said rail members, a non-metallic thermal barrier element interconnecting the inside and outside metallic rail members located at the side marginal edge of a given panel to form a substantially integrated column-like marginal edge structure portions of which are thermally isolated from each other, means for joining together and in sliding relationship to each other the opposed rail members located along the same given sides of said pair of adjacent panels, said means comprising a cover strip provided with a pair of pockets and a tongue element that extends into one of said pockets, the said tongue element being slidingly interengageable with the tongue-like bead element on the one rail member of one panel and the other pocket of said cover strip being adapted to slidingly receive the rail member of the adjacent and opposing panel and said other pocket being further fitted with an inwardly deflected lip element that provides a divergent mouth on said other pocket that allows ready insertion of the rail member on the other opposing panel in said other pocket.

4,020,612

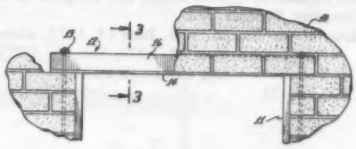
LINTEL STRUCTURE

William T. Welch, Tucson, Ariz., assignor to Smith Pipe and Steel Co., Phoenix, Ariz.

Filed Oct. 21, 1974, Ser. No. 516,765

Int. Cl.² E04C *3/30;* **E04B** *1/16*

U.S. Cl. 52—731 **8 Claims**



1. A lintel structure comprising:

a. an elongated flat plate; and

b. an elongated rigidifying one piece tubular beam of unitary endless cross section fixedly attached to one of the planar surfaces of said elongated flat plate, said elongated rigidifying tubular beam means disposed to extend longitudinally on said elongated flat plate intermediate the opposite longitudinal edges thereof.

4,020,613

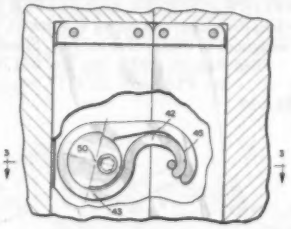
FASTENER

Frank L. Reynolds, 34 Lynn Drive, Monroe, Conn. 06468, and Alfred C. Langer, Pleasant Rise No. 2, Brookfield, Conn. 06804

Filed July 2, 1975, Ser. No. 592,420

Int. Cl.² F16B *5/00*

U.S. Cl. 52—321 **6 Claims**



1. A fastener assembly which can be secured to an object and used in combination with anchor means secured to another object for securing the two objects together comprising: a fastener in the form of an open-ended loop which forms a bore with the opposite ends of said loop forming at least one arm which extends from the loop and is curved to form a hook, an integrally formed projection within said bore whose opposite edges form a pair of stops; an eccentric member disposed within said bore formed by said loop and having a reduced diameter portion which extends about substantially one-half of its circumference and forms a pair of stops which are engageable with said stops on said fastener, the engagement of respective pairs of said stops preventing further rotation of said eccentric member within said bore; said bore being slightly smaller in diameter than said eccentric member so that the peripheral edges thereof frictionally grip the circumference of said eccentric member, and means retaining said fastener and said eccentric in operable assembled relation, whereby rotating said eccentric member will cause said fastener to rotate to engage said hook with said anchor means, further rotation of said eccentric member rotating said eccentric member within said bore such as to stretch said hook engaged with said anchor means, the stretching of said hook

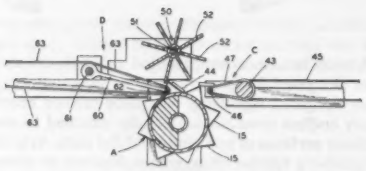
increasing the spring load capacity of said fastener and maintaining tight frictional hold on said eccentric member, and said hook being releasably disengaged from said anchor means by reversing the rotation of said eccentric member.

4,020,614

PACKING STRIPS OF MATERIAL

James P. Smithers, Glen Ellyn, Ill., assignor to Armour and Company, Phoenix, Ariz.

Division of Ser. No. 262,656, June 14, 1972, abandoned. This application June 24, 1974, Ser. No. 482,752
Int. Cl.[2] B65B *25/08*
U.S. Cl. 53—26 15 Claims



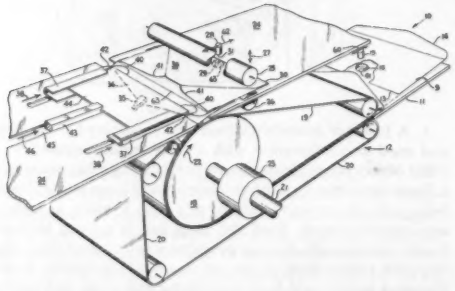
15. In a method for packing strips of material, the steps of rotating a roll in an angular direction such that its top surface moves forwardly, said roll having a step thereon, said step having a front side, a high point, and a rear side, passing a film over said roll while said roll is in rotation whereby said film forms a cover over said step, placing said strip on the rear side of said step and lifting said film with said strip thereon from said rear side of said step.

4,020,615

ENVELOPE INSERTER AND FEEDER SYSTEM

Robert Irvine, Riverside, and Harry E. Luperti, Wilton, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Dec. 15, 1975, Ser. No. 641,027
Int. Cl.[2] B65B *5/04, 57/04*
U.S. Cl. 53—35 12 Claims



10. A method of inserting material into a quantity of envelopes, comprising the steps of:

a. delivering in seriatim a quantity of shingled envelopes, that are respectively overlapped in regard to each other, to an indexing drum;

b. rotatively indexing said indexing drum such that said drum will simultaneously receive one envelope and discharge another envelope for each indexing rotation thereof;

c. sensing the discharge of each envelope from the indexing drum and respectively providing a signal indicative thereof; and

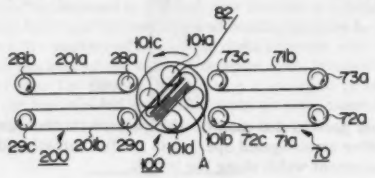
d. inserting material into each envelope discharged from said indexing drum in response to each sensing signal.

4,020,616

PAPER SHEETS PROCESSING APPARATUS

Shunichi Nakajima, Yokohama, and Yoshiro Hashimoto, Tokyo, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed July 2, 1976, Ser. No. 702,357
Claims priority, application Japan, July 8, 1975, 50-83741
Int. Cl.[2] B65B *57/10, 13/12*
U.S. Cl. 53—54 14 Claims



1. A paper sheets processing apparatus comprising:

a draw-out and conveyance section for drawing out one by one a paper sheet from the paper sheets arranged in a laminated state and conveying said paper sheet;

a detection section provided at a terminal end of said draw-out and conveyance section to detect each paper sheet conveyed to said detection section thereby to discriminate said each paper sheet into a normal sheet or a soiled sheet;

a reception and pile-up section for receiving and piling up each discriminated paper sheet in a corresponding one of normal sheet and soiled sheet reception and pile-up boxes through a gate;

a means for separating said normal sheets in units of a prescribed number of sheets to permit them to be piled up;

a bundling member supply means for supplying a bundling member for bundling each unit of the normal sheets piled up in units of said prescribed number of sheets;

a bundling means including a pair of roller groups each having at least two rollers, a rotation mechanism for permitting rotation of each roller about the axis thereof, and an integral revolution mechanism for permitting integral revolution of said pair of roller groups, whereby said normal sheet unit is sandwiched between said pair of roller groups by said rotation mechanism, and said bundling member is wound a prescribed number of times around said normal sheet unit by said integral revolution mechanism.

4,020,617

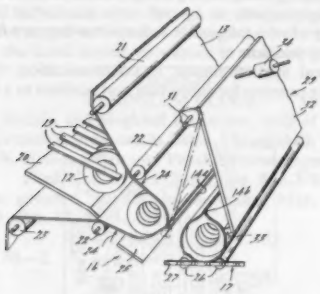
HEAT SHRINK PACKAGING MACHINE

Albert E. Sickinger, Bloomfield Hills, Mich., assignor to Hans Sickinger Co., Pontiac, Mich.

Filed Oct. 22, 1975, Ser. No. 624,653
Int. Cl.[2] B65B *11/10, 53/02*
U.S. Cl. 53—229 3 Claims

1. In a heat shrink packaging machine of the type having a wrapping station, means for guiding a row of spaced aligned articles such as tape rolls to said station, means for moving heat shrinkable film across the path of a row of articles advancing toward said station, and hot knife means engageable with said film on the trailing side of said row of articles to form a heat seal, the improvement comprising a gate pivotally mounted at said station on a fixed pivot and suspended in the path of said row of articles forwardly of said film, and means maintaining constant engagement of said gate with said articles while at said station and while passing under said gate,

said gate being yieldable while still maintaining said constant engagement to permit the wrapped articles to pass thereunder



while maintaining engagement with the package to thereby prevent tilting of articles with respect to each other.

4,020,618

APPARATUS FOR STORAGE AND FEEDING OF BAGS

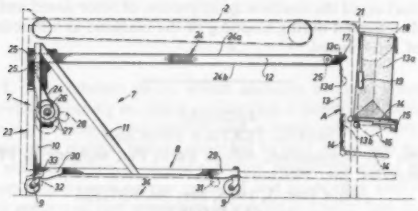
Boye Ditlef Benzon-Petersen, Lund, and Istvan Stefan Lorant, Oxie, both of Sweden, assignors to AB Akerlund & Rausing, Lund, Sweden

Filed Aug. 31, 1976, Ser. No. 719,134

Claims priority, application Sweden, Sept. 8, 1975, 7509940

Int. Cl.² B65B *67/12, 43/28*

U.S. Cl. 53—390 **6 Claims**



1. Storage apparatus for storing and individually feeding bags for use with bag handling apparatus, said bag handling apparatus including a storage area, said storage apparatus comprising a carriage member including means for moving said carriage member into and out of said storage area, holding means for holding bags in a planely compressed state, and feeding means for feeding said individual bags from said holding means to said bag handling apparatus when said carriage is in said storage area.

4,020,619

FULL SELF-PROPELLED LAWN MOWER

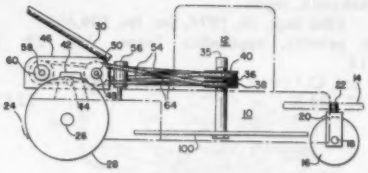
Joseph Massaro, 815 Canterbury Hill, San Antonio, Tex. 78209

Filed Dec. 8, 1975, Ser. No. 638,497

Int. Cl.² A01D *69/00*

U.S. Cl. 56—11.2 **32 Claims**

1. In a lawn mower having body means, front and rear transport wheels operatively mounted on said body means, cutter means operatively mounted on said body means and motor means operatively coupled to said cutter means to drive said cutter means, the improvement comprising: forward-drive friction roller means operatively coupled to said motor means and driven by said motor means and pivotally mounted on said body means to pivot into frictional engagement with either the top front or top back of the rear transport wheels and drive said mower in a forward direction; forward-drive control means operatively engageable with said forward-drive friction roller means to hold said forward-drive friction roller means out of frictional engagement with said driven transport wheel; forward-drive engaging means to pivot said forward-drive friction roller means into frictional engagement with said driven transport wheel; reverse-drive friction roller means operatively coupled to said motor means and driven by said motor means and pivotally mounted on said body means to pivot into frictional engagement with said driven transport wheel and drive said mower in reverse direction; reverse-drive control means operatively engageable with said reverse-drive



friction roller means to hold said reverse-drive friction roller means out of frictional engagement with said driven transport wheel; and reverse-drive engaging means to pivot said reverse-drive friction roller means into frictional engagement with said driven transport wheel, gear means for driving the forward-drive friction roller means and the reverse-drive friction roller means at the same speed by the motor means and the forward-drive friction roller means has a friction roller larger than a corresponding friction roller of the reverse-drive friction roller means, whereby the mower will be driven in a forward direction faster than it can be driven in a reverse direction.

4,020,620

HAYMAKING MACHINES

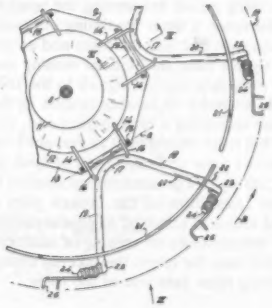
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Dec. 10, 1974, Ser. No. 531,436

Claims priority, application Netherlands, Dec. 12, 1973, 7316979; Dec. 12, 1973, 7316982; Dec. 12, 1973, 7316983; Dec. 12, 1973, 7316980

Int. Cl.² A01D *79/00*

U.S. Cl. 56—370 **25 Claims**



1. A haymaking machine comprising at least one rake member having a central portion rotatable about an upwardly extending axis, supports connected to said central portion by respective pivot means and said supports normally extending outwardly from said central portion and defining an outer circumference of the rake members, tines mounted on each of said support and said tines being movable together with the corresponding support in vertical directions relative to the central portion to follow ground undulation during rotation, the tines on said supports being spaced apart and spanning a given circumferential angle along said outer circumference of rake member, each of said supports being vertically movable

as an independent unit about said pivot means, and comprising at least two lines that are positioned one behind the other with respect to the normal direction of rotation of said rake member.

4,020,621

METHOD OF AND APPARATUS FOR ENDING THE BROKEN YARN IN AN OPEN-END SPINNING SYSTEM

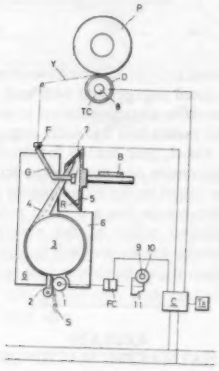
Kazuo Tsubata, Kyotoshi, Japan, assignor to Hironori Hirai, Nagaokakyoshi, Japan

Filed Sept. 26, 1974, Ser. No. 509,455

Claims priority, application Japan, July 29, 1973, 48-109712

Int. Cl.² D01H *15/00, 13/18;* **F16D** *67/06*

U.S. Cl. 57—34 R **22 Claims**



3. Apparatus for piecing up broken yarn ends in an open-end spinning machine including a rotor, means for feeding separated fibers to the rotor and means for withdrawing spun yarn from the rotor, comprising a feed clutch operable to start and stop feeding of separate fibers to the rotor, a winding drum having a take-up clutch associated therewith operable to start and stop taking out of spun yarn from the rotor, at least one tension sensing means for sensing the tension in the yarn taken out of the rotor, a timer for timing intervals since insertion of a broken yarn end into the rotor and an electric circuit for receiving signals from the tension sensing means and the timer and for providing control signals to the feed clutch and take-up clutch, whereby on sensing tension in the yarn taken out of the rotor indicating a broken yarn end, the feed clutch and take-up clutch are disengaged to prevent feeding of separated fibers to the rotor and taking out of spun yarn from the rotor and on sensing of a predetermined tension in the broken yarn end after reinsertion of the broken yarn end into the rotor, the feed clutch is actuated to pass separated fibers into the rotor and subsequently on sensing of additional tension in the yarn end fed into the rotor, the take-up clutch is actuated to take pieced-up spun yarn out of the rotor.

4,020,622

METHOD AND APPARATUS FOR A JOINT START-UP AND STOPPING OF THE SPINNING POSITIONS OF AN OPEN-END SPINNING MACHINE

André Lattion, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed July 1, 1976, Ser. No. 701,798

Int. Cl.² D01H *1/12, 13/16, 15/00*

U.S. Cl. 57—34 R **8 Claims**

1. An open-end spinning machine comprising

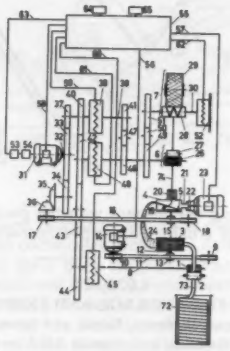
at least one spinning position having a rotatable rotor therein for spinning fiber into yarn;

a fiber sliver feed means for delivering sliver to said spinning position;

a fiber opening means for opening the fiber delivered to said spinning position;

a plurality of yarn take-off rolls for removing yarn from said spinning position;

an external suction means in communication with said spinning position for subjecting said position to a vacuum; and



a control means connected to each of said rotor feed means, opening means, take-off rolls, and suction means for selectively activating and deactivating each of said rotor, feed means, opening means, take-off rolls and suction means, wherein said suction means is activated during a start-up of the machine as a function of rotor speed and is deactivated during stopping of the machine as a function of rotor speed.

4,020,623

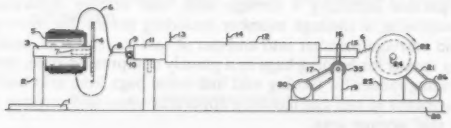
NOVEL TEXTILE PROCESS

Warren W. Drummond, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 3, 1975, Ser. No. 637,346

Int. Cl.² D01H *7/92*

U.S. Cl. 57—157 F **13 Claims**



1. A method for preparing a textile strand from a wet textile strand feed comprising feeding the wet textile strand into a zone of fluid turbulence, passing the strand through said zone in a given direction, contacting the strand in said zone with a fluid directed in a path circumferential to the strand and the long axis of the zone to thereby agitate the strand and apply a false twist thereto, and thereby produce a rounded and well-consolidated strand, passing the strand from the zone of turbulence through a drying zone operating at a temperature sufficient to remove a substantial portion of the moisture from the strand and collecting the strand after drying on a spool in successive layers having the strand in side-by-side relationship in each layer.

9. A method of treating glass fiber strand from a wet forming package of glass fiber strand comprising feeding the glass fiber strand from said wet forming package to a zone of fluid turbulence, passing the wet strand through said zone, continuously contacting said strand in said zone with a fluid flowing circumferentially around said zone at a high rate of speed to

thereby agitate the strand and impart a false twist thereto during its passage through said zone, to thereby produce a rounded and well-consolidated strand, passing the strand from said fluid turbulence zone through an elongated drying zone, drying the strand as it passes through said drying zone and winding the dried strand on a spool in successive layers.

4,020,624
PENDULUM CLOCK

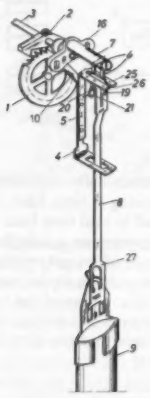
Gerhart Steinle, and Siegfried Rossmann, both of Schwenningen, Germany, assignors to Urgos Uhrenfabrik Schwenningen a.N. Haller, Jauch und Pabst, Schwenningen, Germany

Filed Mar. 31, 1975, Ser. No. 563,370

Claims priority, application Germany, Mar. 29, 1974, 2415189; Oct. 17, 1974, 2449435

Int. Cl.² G04B *15/14, 17/02*

U.S. Cl. 58—2 **6 Claims**



1. A pendulum clock which includes in combination: a pendulum having an upper end section, a pendulum extension having an upper end portion and a lower end portion, said lower end portion being connected to said upper end section of said pendulum, a carrier member, pendulum spring means supported by said carrier member and supporting said upper end portion of said pendulum extension, a keeper fork including a protective rigid connecting member with a fork-shaped portion having fork prongs thereof straddle said pendulum extension suspended below said pendulum spring means automatically to assure swinging oscillation in a common plane for said carrier member and said pendulum extension, and a keeper shaft operatively connected to said keeper fork, said keeper fork and said protective rigid connecting member with said fork-shaped portion consisting of a single integral piece that takes up turning forces upon said pendulum spring means.

4,020,625
EXPANDED SCALE TIMER

Joseph J. Mahon, Libertyville; William Redfield, Lake Forest, and Ignacy Supel, Chicago, all of Ill., assignors to The Singer Company, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,384

Int. Cl.² G04F *3/02*

U.S. Cl. 58—21.13 **10 Claims**

1. A timer including a support, a housing mounted on the support and enclosing a motor and a reduction gear train the final gear of which is mounted on a drive shaft which projects through the housing,

a first non-circular gear mounted on the shaft,

a driven shaft parallel to the drive shaft and axially movable between a normal position and a set position,

a spring biasing the driven shaft to its normal position,

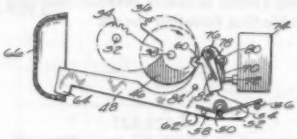
a gear and cam assembly fixed on the driven shaft and including a second non-circular gear and a cam,

said non-circular gears being in mesh at all times so the gear ratio from the drive to driven shafts is variable,

said cam having an active cam surface and a notch in the surface at the zero position with an abrupt generally radial drop surface at the leading edge of the notch as the cam is driven in a timing direction towards the zero position,

clutch means in said gear train operative to disengage the gear train,

means operated upon axial movement of the driven shaft to its set position to disengage said clutch means and permit rotation of the cam in the reverse direction opposite said timing direction to a desired position without the drag of the gear train,



a lever including a cam follower,

means pivotally mounting the lever on the support,

a spring biasing the lever to hold the follower against the cam,

a switch mounted on the support for actuation by the lever,

a bell mounted on the support,

said lever including a portion functioning as a striker operative to hit the bell when the follower drops into said cam notch.

4,020,626
ELECTRONIC TIMEPIECE

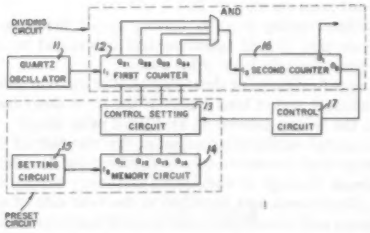
Tsuneo Kuwabara; Kouzo Yokoyama, both of Tokyo, and Takenobu Kobori, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed May 14, 1975, Ser. No. 577,166

Claims priority, application Japan, May 14, 1974, 49-53543

Int. Cl.² G04B *27/08;* G04C *3/00*

U.S. Cl. 58—23 R **3 Claims**



1. In an electronic timepiece: a quartz oscillator for producing high frequency pulses suitable as a time standard; a dividing circuit connected to said quartz oscillator to receive therefrom the high frequency pulses and divide them into lower frequency pulses, said dividing circuit comprising adjustably settable first counting means for counting an adjustably set predetermined number of high frequency pulses and thereafter providing an output pulse, and second counting means receptive of the output pulses from said first counting means for counting a predetermined number thereof and thereafter providing an output time pulse; adjusting means for selectively adjusting the dividing ratio of said dividing circuit to accordingly adjust the frequency of the output time pulses, said adjusting means comprising a selectively actuatable switch,

and means for memorizing the number of times said switch has been actuated and presetting said first counting means comprising a preset circuit including a memory circuit for memorizing in logic form the number of times said switch has been actuated and a control setting circuit operative to preset the logic complement of the memorized content of said memory circuit in said adjustably settable first counting means to thereby selectively adjust the number of high frequency pulses counted by said first counting means and accordingly control the frequency of the output time pulses to thereby adjust for variations in the output of said quartz oscillator; and means including a control circuit connected to said second counting means and responsive to output pulses therefrom to periodically produce an adjustment signal and apply the same to said control setting circuit to effect periodic resetting of said adjustably settable first counting means.

4,020,627

LIQUID CRYSTAL DISPLAY ELECTRONIC WATCH

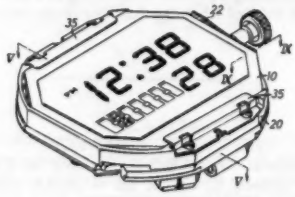
Masateru Yoshida, Tanashi; Yoshio Iinuma, Higashimurayama; Tetuya Yasuda, Tokyo, and Satoshi Kimura, Tokorozawa, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Oct. 1, 1974, Ser. No. 510,918

Claims priority, application Japan, Oct. 6, 1973, 48-116100

Int. Cl.² G04B *19/30, 19/24, 27/00;* **G08B** *23/00*

U.S. Cl. 58—50 R **11 Claims**



1. A liquid crystal display type watch comprising:
1. a metal substrate;
2. a front flexible print sheet mounted on the front side of said substrate;
3. a liquid crystal cell arranged on and connected to said front print sheet;
4. a timekeeping decoder driving circuit arranged on the front side of said substrate and connected to a wiring pattern on said front print sheet;
5. a rear flexible print sheet provided at the rear side of said substrate and at least a part of the print sheet connected to the wiring pattern on said front print sheet;
6. a crystal oscillator arranged at the rear side of said substrate and connected to said timekeeping decoder driving circuit through an oscillation frequency divider circuit;
7. a fixed condenser arranged at the rear side of said substrate and connected to the input of said crystal oscillator;
8. a trimmer condenser arranged at the rear side of said substrate and connected to the output of said crystal oscillator;
9. a booster circuit arranged at the rear side of said substrate and connected to the output of said oscillation frequency circuit for supplying high voltage to said timekeeping decoder drive circuit;
10. a battery cell arranged at said rear side of said substrate and connected to said oscillation frequency circuit for delivering a power to said timekeeping decoder drive circuit through said rear print sheet, said metal substrate and said front print sheet; and
11. switch means connected to said timekeeping decoder drive circuit and operated by a single exteriorly operating member.

4,020,628

AUTOMATIC REGULATION OF AN ELECTRONIC WATCH

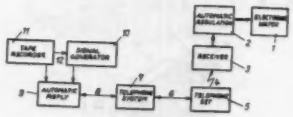
Eric A. Vittoz, Cernier, Switzerland, assignor to Centre Electronique Horloger S.A., Switzerland

Filed Sept. 29, 1975, Ser. No. 617,654

Claims priority, application Switzerland, Oct. 14, 1974, 13779/74

Int. Cl.² G04B *27/00;* **G04C** *3/00*

U.S. Cl. 58—145 K **9 Claims**



1. A process for automatically regulating an electronic watch of the type comprising a time base, memory circuits, and display means coupled to said time base and said memory circuits, comprising composing on a telephone set in a telephone system the call code of an automatic telephone reply apparatus to which is connected a device supplying data necessary for the regulation at any time of the watch, and placing the watch so that coded signals transmitted by the reply apparatus control the state of said memory circuits of the watch to automatically set the latter.

4,020,629

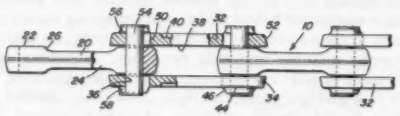
SOLID SIDE BAR RIVETLESS CHAIN

George L. Wilmot, Stroudsburg, and James A. Redding, Pittsburgh, both of Pa., assignors to Wilmot Engineering Company, White Haven, Pa.

Filed Feb. 5, 1976, Ser. No. 655,578

Int. Cl.² F16G *13/08*

U.S. Cl. 59—85 **5 Claims**



1. A rivetless chain comprising a plurality of pairs of spaced side bars interconnected by center links and a pivot pin extending through the overlapping ends of a pair of side bars and a center link for pivotally connecting the center link with the side bars, each of said side bars being solid and imperforate from end to end except for a cylindrical opening through each end thereof, said pin being cylindrical and being rotatably and reciprocally but not laterally movably received in said openings, said center link having an elongated slot disposed therein with the end portions of the center link being flat and thicker than the central portion thereof to enable the side bars to move inwardly along the length of the pin when the central portion of the center link is registered with the side bars when the center link is in generally perpendicular relation to the side bars, radially projecting lug means on each end of said pin, the outer surface of each of the side bars including radially extending notch means receiving said lug means when the side bars are in their remote relationship and the end portion of the center link is disposed between the side bars, said lug means being disengageable from the notch means for disas-

sembly of the pin, side bars and center link when the central portion of the center link is disposed between the end portions of the side bars, each of said cylindrical openings in the side bars including a wall engaging substantially the entire periphery of the center pin, and a single groove extending from end to end of the wall forming the opening and enabling passage of the lug means on one end of the pin when the pin has been rotated to register the lug means with the groove.

4,020,630

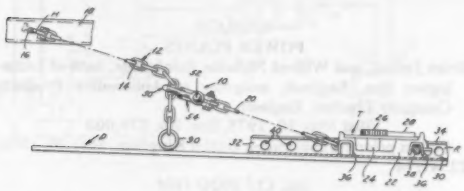
CHAIN ADJUSTMENT LINK

Louis K. DeShetler, Allen Park, Mich., assignor to Whitehead & Kales Company, River Rouge, Mich.

Filed Oct. 17, 1975, Ser. No. 623,492

Int. Cl.² F16G *15/04*

U.S. Cl. 59—86 **14 Claims**



1. A device for adjusting the length of a link chain comprising a member having a slot therein of a width sufficient to receive a link chain and permit lengthwise movement thereof, a slot extension communicating with said slot but of a lesser width sufficient to receive a link of the chain but insufficient to permit lengthwise movement thereof, a keeper carried by said member and moveable from a locking position projecting into said slot to retain the chain, inserted from either side of the slot, in said slot extension to a released position away from said slot, and a tensioning element such as a second chain attached to said keeper in a manner such that tension in said tensioning element retains said keeper in its locking position.

4,020,631

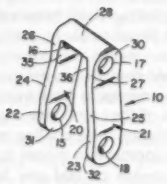
LINK FOR PINTLE CHAIN

Claude L. Wildman, Thomson, Ill., and George A. Hellmer, Maquoketa, Iowa, assignors to Richard A. Kummerer and Alfred Den Besten, both of Fulton, Ill., part interest to each

Continuation of Ser. No. 457,801, April 4, 1974, abandoned. This application July 8, 1975, Ser. No. 594,190

Int. Cl.² F16G *15/12*

U.S. Cl. 59—90 **15 Claims**



1. A pintle link for a pintle chain comprising: a U-shaped link composed of a pair of sides with free end sections at its open end, opposite end sections at its closed end, and inwardly converging sections joining with and extending between the free end sections and the opposite end sections, said free end sections and converging sections being of uniform thickness, said opposite end sections being thicker beginning adjacent their junction with the converging sections; each of said end sections having a pin opening therein in alignment with an opening in its respective counterpart end section on the opposite side and a crosspiece at the closed end of the link integral with and joining said opposite end sections.

4,020,632

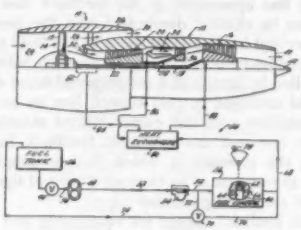
OIL COOLING SYSTEM FOR A GAS TURBINE ENGINE

George A. Coffinberry, Cincinnati, and Howard B. Kast, Fairfield, both of Ohio, assignors to The United States of America as represented by the United States National Aeronautics and Space Administration Office of General Counsel-Code GP, Washington, D.C.

Division of Ser. No. 596,641, July 17, 1975. This application Feb. 4, 1976, Ser. No. 655,149

Int. Cl.² F02C *9/08*

U.S. Cl. 60—39.03 **10 Claims**



1. In a method of operating a gas turbine engine fuel delivery and control system, the steps of:

pumping fuel at increased pressure from a fuel reservoir;

metering the rate of pressurized fuel flow to the engine;

maintaining the pressurized metered fuel in heat exchange relationship with hot engine oil; and

returning all fuel in excess of the metered fuel back to the fuel reservoir.

4,020,633

PROGRAMMABLE HYDRAULIC POWER CONTROLS FOR INJECTION MOLDING MACHINES

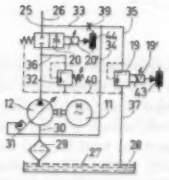
Karl Hehl, Arthur-Hehl-Str. 32, 7298 Lossburg, Germany

Filed June 28, 1976, Ser. No. 700,112

Claims priority, application Germany, June 28, 1975, 2528963

Int. Cl.² F16H *39/46*

U.S. Cl. 60—445 **7 Claims**



1. In the hydraulic drive system of an injection molding machine, which includes a hydraulic power unit with a variable delivery hydraulic pump driven by an electric motor and controlled by a pump control member, so as to supply variably pressurized hydraulic fluid at variable flow speeds from a fluid reservoir through a main supply line to such units as the die

closing unit and the injection unit, in said hydraulic drive system, hydraulic power controls comprising in combination:

a proportional-response flow control valve which is controlled by means of a proportional-force electromagnet and arranged in the main supply line of the variable delivery pump so as to control the flow rate at which pressurized fluid is supplied through said line, in response to an electronic control signal imposed on said electromagnet;

a branch connection in the main supply line downstream of said flow control valve;

a hydraulic feedback line leading from the branch connection to the control member of the variable delivey pump, thereby forming a feedback loop for the adjustment of the pump setting in compensation for fluid leakage and friction losses, the feedback line including in it an adjustable control diaphragm;

a branch line connected to the feedback line at a point between its control diaphragm and the pump control member and leading from there to the fluid reservoir;

a proportional-response pressure control valve which is controlled by means of a proportional-force electromagnet and arranged in said branch line so as to directly communicate with the pump control member, via the branch line and the hydraulic feedback line, thereby setting the pressure at which fluid is supplied by the pump, in response to an electronic control signal imposed on said electromagnet; and

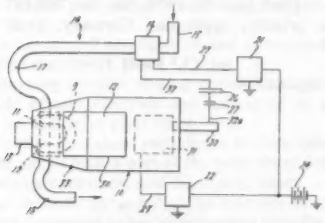
electronic feedback means for monitoring and eliminating in each of the two proportional-response control valves any deviations of the actual valve position settings from the nominal valve settings corresponding to the electronic control signals which are fed to the respective proportional-force electromagnets.

4,020,634

VISCOUS BLOWER DRIVE

John E. Bradley, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed May 5, 1976, Ser. No. 683,369
Int. Cl.² F02G *1/04*
U.S. Cl. 60—517 **6 Claims**



1. In a Stirling engine having an external heating circuit employing a blower and a closed internal fluid system actuated by predetermined thermal operating conditions for driving an output member, which in turn is adapted to drive said blower, a drive system for said blower comprising:

a. first motor means powered by a source of stored electrical energy and selectively driving said output member when both said internal system is above a first level of said predetermined thermal operating conditions, and said output member is below a predetermined r.p.m.,

b. a second motor means powered by a source of stored electrical energy and selectively driving said blower when said internal system is below a second level of said predetermined thermal operating conditions, said second level being higher than said first level, and

c. variable ratio power transmitting means interconnecting said output member and blower providing drive therethrough when said second level of predetermined thermal operating conditions is exceeded.

4. A blower system for a Stirling engine having an external heating circuit employing forced air driven by a blower, comprising:

a. a rotary blower having an impeller effective to pressurize a supply of ambient air,

b. an accessory shaft driven by said engine, and

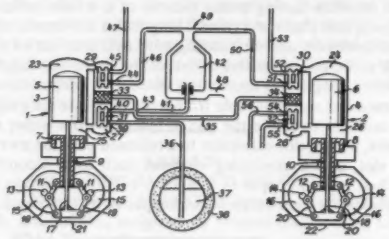
c. means interposed between said accessory shaft impeller providing a variable drive ratio therebetween inversely proportional to the output speed of said engine, said means having an interfitting viscous shear element to provide said variable ratio.

4,020,635

POWER PLANTS

Brian Joynes, and Wilfred Nicholas Bainbridge, both of Leamington Spa, England, assignors to Automotive Products Company Limited, England

Filed May 19, 1975, Ser. No. 579,003
Claims priority, application United Kingdom, May 20, 1974, 22347/74
Int. Cl.² F02G *1/04*
U.S. Cl. 60—525 **8 Claims**



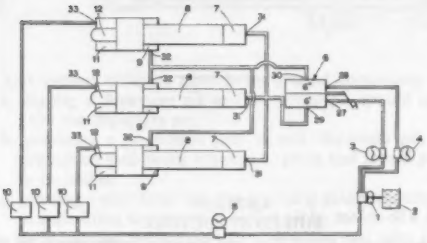
1. A power plant comprising combustion means for generating heat for use in a power plant with at least two hot gas engines, such engine comprising: first and second working fluid spaces, regenerative heat exchange means in communication with said first and second working fluid spaces, reciprocating means for varying the volume to said working fluid spaces, heating means for heating working fluid in said first working fluid space, cooling means adjacent to said second working fluid space, a source of cooling fluid and first conduit means connecting said source of cooling fluid and said cooling means to convey cooling fluid from said source of cooling fluid to said cooling means to cool working fluid in said second working fluid space; means for conveying the products of combustion from said combustion means to the heating means of said two hot gas engines to heat working fluid in said first working fluid space of the respective engines; second conduit means in communication with cooling means of said one hot gas engine and the combustion means to convey cooling fluid from said cooling means of said one hot gas engine to the combustion means combusiton therein, the cooling means of said second hot gas engine being independent of the combustion means, a further source of cooling fluid, third conduit means in communication with said further source of cooling fluid to said combustion means for combustion therein, and heat exchange means for transferring heat from cooling fluid fed to said independent cooling means to the cooling fluid fed from said further source of cooling fluid to said combustion means wherein, in operation of the plant, said cooling fluid fed from said further source of cooling fluid to said combustion means has had its physical state changed by heat which it absorbed in the cooling means of said one hot gas engine.

4,020,636

MASTER CYLINDER ASSEMBLIES

David Anthony Harries, Solihull, England, assignor to Girling Limited, Birmingham, England

Filed Sept. 30, 1974, Ser. No. 510,593
Claims priority, application United Kingdom, Oct. 2, 1973, 46032/73
Int. Cl.² B60T 13/14; F15B 7/00
U.S. Cl. 60—547 5 Claims



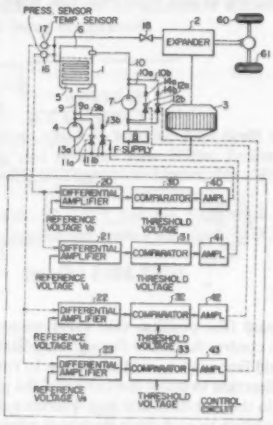
1. A master cylinder assembly for a vehicle hydraulic braking system comprising a housing having a first bore and a second bore, a modulator piston assembly working in said second bore, a master cylinder piston working in said first bore and adapted to be advanced in said first bore on advancement of the modulator piston assembly in said second bore, said housing being provided with a first pressure space defined in said first bore in front of said master cylinder piston, and with second, third, and fourth independent pressure spaces in said second bore and bounded by said modulator piston assembly, pressurisation of said second pressure space causing said modulator piston assembly to be urged rearwardly, whereas pressurisation of either of said third or fourth pressure spaces causing said modulator piston assembly to be urged forwardly, said housing being provided with a first inlet port for connecting said first pressure space to a fluid reservoir, with an outlet port leading from said first pressure space for connecting to a wheel brake, with a second inet port leading into said second pressure space, and with third and fourth inlet ports leading respectively into said third and fourth pressure spaces, a normally open valve controlling communication between said first pressure space and said first inlet port and being adapted to close on forward movement of said master cylinder piston from its retracted position, said master cylinder assembly further comprising a dual booster valve assembly comprising first and second hydraulically separate booster valves, a single actuating member controlling both booster valves, said first booster valve being provided with a first booster valve inlet and a first booster valve outlet, said second booster valve being provided with a second booster valve inlet and a second booster valve outlet, said first and second booster valve inlets being connected to two separate supplies of pressure fluid, means connecting said first and second booster valve outlets independently to said third and fourth pressure spaces in said housing respectively, whereby on actuation of said actuating member pressure fluid is supplied to both said third and fourth pressure spaces when both of said pressure fluid supplies are operational, and is supplied to one of said third and fourth pressure spaces on failure of either of said supplies to advance the modulator piston assembly.

4,020,637

VEHICLE STEAM ENGINE USING ON-OFF VALVES FOR CONTROLLING STEAM TEMPERATURE AND PRESSURE

Hisashi Izumi, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 26, 1976, Ser. No. 652,641
Claims priority, application Japan, Jan. 27, 1975, 50-11102
Int. Cl.² F01K 13/02
U.S. Cl. 60—665 4 Claims



1. A vehicle steam engine comprising, a steam generating unit; means for converting the generated steam into useful work; a condenser connected to the converting means to condense the steam to the liquid state; a first pump connected to the condenser to supply the liquid to the steam generating unit; a second pump connected to a source of fuel supply to supply the fuel to the steam generating unit to sustain combustion therein; first means for sensing the pressure of the steam and producing a first signal representative of the sensed pressure; second means for sensing the temperature of said steam and producing a second signal representative of the sensed temperature; first on-off fluid control means connected to the first pump to control the flow rate of the liquid; second on-off fluid control means connected to the second pump to control the flow rate of the fuel; and a control circuit responsive to the first and second signals to produce third and fourth signals respectively when each of said first and second signals differs in magnitude from a preset value, said third and fourth signals being connected to operate the first and second on-off fluid control means, respectively to provide changes in the flow rate of said liquid and fuel.

4,020,638

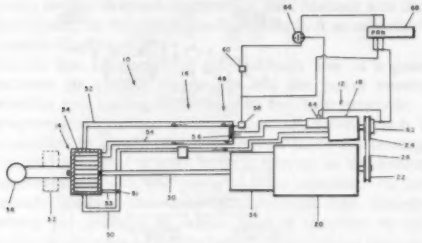
AUXILLIARY FLUID POWER SYSTEM

Harvey D. Allen, 11309 Brightridge Drive, Seffner, Fla. 33584

Filed Oct. 28, 1975, Ser. No. 625,832
Int. Cl.² F01B 21/04
U.S. Cl. 60—718 9 Claims

1. An auxilliary fluid power system for use with a prime mover such as an internal combustion engine having a power train including a control selector: said auxilliary fluid power system comprises a fluid drive means coupled to the power train of the prime mover to drive said fluid drive means, an auxilliary drive means mechanically coupled to the power train, said auxilliary drive means including a housing having a rotor rotatably mounted therein, said housing including a first and second inlet formed thereon, a fluid conduit means coupled between said fluid drive means and said auxilliary drive means to supply fluid from said fluid drive means to said auxilliary drive means, and a control means including a valve

means having a first and second position to selectively control the flow of fluid from said fluid drive means to said auxilliary drive means through said fluid conduit means, said fluid conduit means comprises a first and second fluid supply branch, said first and second inlet coupled to said fluid drive means through said first and second supply branches respectively, said rotor operable in a first and second direction, said system further including a valve control having a first and second position, said valve control coupled between the control selector of the power train and said valve means, said first inlet disposed relative to said rotor such that when said valve control is in said first position said valve means is in said first position to control fluid flow through said first conduit branch through said first inlet against said rotor to rotate said rotor in said first direction to boost the output of the power train when operating in the first direction and wherein said second inlet is disposed relative to said rotor such that when said valve control is in said second position said valve means is in said second position to control fluid flow through said second conduit branch through said second inlet against said rotor to rotate said rotor in said second direction to retard the output of the power train when operating in said second position.



4,020,639

OVAL PIPE WITH A FLAT BASE

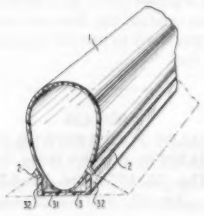
Syoji Nagare, Kusatsu, and Kozo Osawa, Otsu, both of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 29, 1975, Ser. No. 645,134

Claims priority, application Japan, Dec. 26, 1974, 50-3608[U]

Int. Cl.² E02B *13/00*

U.S. Cl. 61—10 **1 Claim**



1. In combination, a synthetic resin drain pipe and an underlying synthetic resin support plate,

said drain pipe being adapted for substantially horizontal installation along the flow axis of said pipe and being of oval cross-section, with the major axis extending vertically,

said support plate comprising a flat portion and integral sidewalls bent upwardly from the flat portion with said plate being of U-shape cross-section and directly facing and underlying said oval drain pipe,

a pair of ridges extending integrally from opposed sides of said oval drain pipe near the bottom thereof with said ridges being formed on said oval drain pipe and said said oval drain pipe and said flat plate having walls of vertical height such that said ridges abut the ends of said sidewalls and the bottom of said pipe abuts the surface of the flat plate intermediate of said sidewalls which directly faces said oval pipe to maintain said oval pipe in vertical orientation along its major axis to permit a greater depth of water therein at low water to maintain water flow through said drain pipe at considerable speed and prevent the accumulation of solid filth or sedimentation therein.

4,020,640

SHIELD STRUCTURE

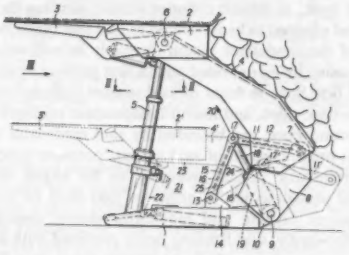
Siegfried Sigott; Alfred Zitz, and Heinrich Suessenbeck, all of Zeltweg, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Aug. 17, 1976, Ser. No. 715,202

Claims priority, application Austria, Sept. 26, 1975, 7392/75

Int. Cl.² E21D *15/44*

U.S. Cl. 61—45 D **4 Claims**

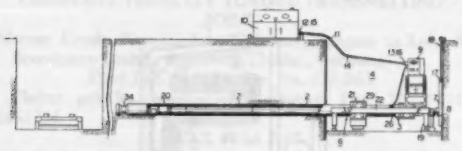


1. Mine roof support and shield structure for the face support in mines, comprising a base frame, a shield pivotally connected to said base frame and supported against this base frame by at least one prop, and at least one load-bearing rocking cap pivotally connected to said shield, noting that at least one load-bearing hinged cap is pivotally connected to said shield and that the pivotal point of the rocking cap or caps is, as seen in a top-plan view, located behind the front edge, facing the mine face, of the base frame, and noting that the pivotal point of the rocking cap, the pivotal point of the hinged cap and preferably also the point of attack of the prop or props supporting the shield structure are adjacent one another, and further noting that the shield is pivotally connected to the base frame with interposition of at least one link, the position of which link is defined by at least one strut being variable in length and acting, on the one hand, on the base frame, and, on the other hand, on the link, on the shield or on the joint connecting the link with the shield, characterized in that the prop is inclined in rearward direction and that the strut of variable length is formed of two tension links being mutually pivotally connected, the pivotal joint of that tension links being acted upon by a hydraulic cylinder-piston-means in transverse direction to said tension links, said cylinder-piston-means being supported against the base frame at the side of the tension links being opposed to the props.

4,020,641
METHOD OF LAYING PIPES IN THE GROUND

Hiroshi Takada, Yokohama, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 22, 1975, Ser. No. 643,115
Int. Cl.² F16L *1/00*
U.S. Cl. 61—72.7 4 Claims

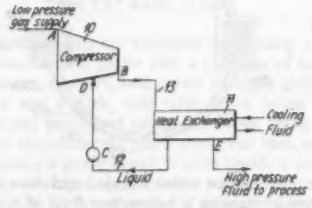


1. A method of laying pipes in the ground comprising:
a. digging a departure pit and an arrival pit spaced apart from the departure pit;
b. providing a propulsion jack in said departure pit, the propulsion jack being adapted to press and propel pipes to be laid in;
c. pressing a pilot head into the ground in said departure pit in a direction towards said arrival pit by means of a pilot jack coupled thereto and then pressing said pilot head further into said ground, wherein the pilot jack is placed into a contracted state by the pressing force of said propulsion jack;
d. pressing pilot pipes successively into the ground by said propulsion jack, said pilot pipes being in a following relationship with said pilot head;
e. measuring the position and posture of said pilot head at the departure pit during the pressing and laying-in of the pilot head;
f. controlling the straight advance of the pilot head based on said measurement;
g. bringing a multistage head into abutment against the rearmost end of the laid-in pilot pipes after the latter are laid in;
h. pressing the rear end of said multistage head and laying in the multistage head by said propulsion jack;
i. connecting pipes to be laid in to the rear end of said multistage head, said pipes being larger in diameter than said laid-in pilot pipes;
j. propelling said pipes in succession into the ground by said propulsion jack; and
k. collecting said laid-in pilot pipes in the arrival pit.

4,020,642
COMPRESSION SYSTEMS AND COMPRESSORS

Geoffrey Gordon Haselden, Leeds, and Guy Francis Hundy, Gravesend, both of England, assignors to Hall-Thermotank Products Limited, London, England

Filed Nov. 25, 1974, Ser. No. 527,104
Claims priority, application United Kingdom, Nov. 19, 1973, 53666/73; Mar. 20, 1974, 12441/74
Int. Cl.² F25B *43/02*
U.S. Cl. 62—84 12 Claims

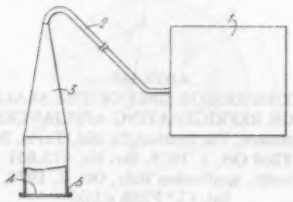


1. A method for the oil-free compression of a gas or vapour using a compression machine of the type having at last one rotary positive-displacement stage and having a casing with a low-pressure inlet and a high pressure outlet and having a compressor rotor in said casing, comprising the steps of introducing the gas or vapour into the inlet, compressing the gas or vapour in the machine, and lubricating the compression machine by injecting thereinto at at least one point intermediate said inlet and said outlet a lubricating fluid consisting entirely of the liquid phase of the gas or vapour being compressed, the quantity of said liquid phase injected being sufficient to substantially fill the clearance gaps between the rotor and the casing and being sufficient to maintain the temperature of the compression machine close to the saturation temperature of the gas or vapour being compressed.

4,020,643
ICE CONFECTION

Clive Arnold Roberts, Oakley; Jennifer Joan Scott nee Reid, Wellingborough, and Michael John Willis, Bedford, all of England, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed Feb. 27, 1975, Ser. No. 553,749
Claims priority, application United Kingdom, Mar. 1, 1974, 9395/74
Int. Cl.² F25B *25/00*
U.S. Cl. 62—322 6 Claims



1. A process for producing an extruded ice confection of fancy cross-section comprising extruding an ice confection through a secondary plate prior to extruding through a primary plate, said primary plate being located at the open end of an extrusion head and having a multiplicity of holes arranged in an array which defines the cross-section of the extruded ice confection, and said holes each having a surface area in the range of about $(0.187\ mm)^2$ to about $(3.353\ mm)^2$, and said secondary plate having a multiplicity of holes which are smaller than the holes of the primary plate.

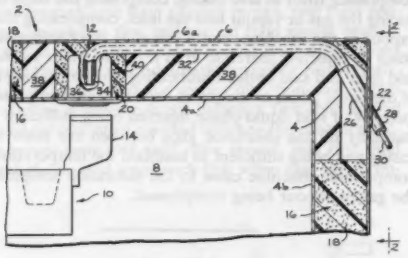
4,020,644
WATER DELIVERY SYSTEM AND METHOD FOR FORMING SAME

Howard D. F. True, Jr., Fern Creek; Bob D. Merryman, and Robert B. Gelbard, both of Louisville, all of Ky., assignors to General Electric Company, Louisville, Ky.

Filed Jan. 10, 1974, Ser. No. 432,287
Int. Cl.² F25C *1/00*
U.S. Cl. 62—340 2 Claims

1. In a refrigeration apparatus having inner and outer spaced-apart cases each having a plurality of walls, a freezing compartment defined by at least a portion of the inner case, an automatic ice-forming apparatus within the freezing compartment, a water supply line having an outer tube associated with the ice-forming apparatus and extending through the space between the cases, and insitu foamed insulating material in the space between the cases, the improvement comprising:
a holding element positioned between the cases adjacent the freezing compartment and in contact with the water supply line and the inner and outer cases, said holding element being an insulating material having a preformed configuration for maintaining said supply line in contact and heat exchange relationship along the outer case dur-

ing foaming of and contact with the insitu foamed insulating material, wherein the outer tube is in contact with first



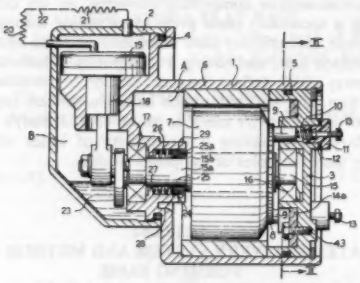
and second abutting walls of the outer case adjacent the juncture of said walls.

4,020,645

MOTOR-COMPRESSOR UNIT OF THE SEALED TYPE FOR REFRIGERATING APPLIANCES

Angiolina Pittatore, Via Ventimiglia 202, Turin, Italy

Filed Oct. 2, 1975, Ser. No. 618,861
Claims priority, application Italy, Oct. 2, 1974, 69946/74
Int. Cl.² F25B *43/00*
U.S. Cl. 62—474 **10 Claims**



1. In a refrigeration system comprising:
a. an hermetically sealed envelope;
b. a direct current electric motor of the brush-and-commutator type contained in said hermetically sealed envelope;
c. a compressor contained in said hermetically sealed envelope and operatively connected to said direct current motor;
d. sealing means in said hermetically sealed envelope for realizing a tight seal between said direct current electric motor and said compressor with regard to the compressor lubrication oil and with regard to the carbon dust generated by the sliding of the brushes on the commutator;

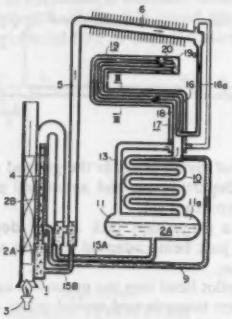
the improvement comprising absorption means disposed in said hermetically sealed envelope adjacent the commutator of said direct current motor for chemically absorbing the products originating from the decomposition of the refrigerating fluid in said compressor which are liable to damage said compressor and the other component of the refrigerating system.

4,020,646

DIFFUSION-ABSORPTION TYPE REFRIGERATING MACHINE

Hiroshi Oda, Okazaki, and Hideki Fukunaga, Nagoya, both of Japan, assignors to Howa Sangyo Kabushiki Kaisha, Japan

Filed Feb. 26, 1976, Ser. No. 661,461
Int. Cl.² F25B *15/10*
U.S. Cl. 62—492 **7 Claims**



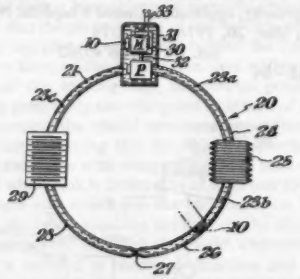
1. In a refrigerating machine of diffusion-absorption type having a liquid receiver containing a concentrated solution of a refrigerant, an absorber communicating at one end thereof with the receiver, a condenser, a heat exchanger, an evaporator having an inlet part and an outlet part communicating through one passageway of the heat exchanger to the receiver, a first tube for conducting the refrigerant in condensed liquid form from the condenser to said inlet part of the evaporator, and a second tube for conducting an auxiliary gas from the other end of the absorber through another passageway of the heat exchanger to said inlet part; the improvement in which said inlet part of the evaporator is closed off from the outside, said second tube is disposed within and extends coaxially through the heat exchanger and the evaporator and is open-ended at said inlet part to the interior of the evaporator, and said first tube is disposed within and extends through said second tube and is open-ended at said inlet part to the interior of the evaporator.

4,020,647

COMBINATION OF CAPACITOR IN REFRIGERANT SYSTEM

George A. Shirn, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Nov. 7, 1975, Ser. No. 629,838
Int. Cl.² F25B *39/04*
U.S. Cl. 62—508 **7 Claims**



1. The combination within a sealed enclosure of a refrigeration system containing a halocarbon fluid of a motor and an uncased capacitor section containing a polypropylene spacer material, said section positioned in the halocarbon fluid within the system and being impregnated with the halocarbon fluid

whereby the halocarbon fluid and the polypropylene spacer provide the dielectric for the capacitor section, and an electrical connection of the capacitor section to the motor being contained entirely within the sealed enclosure of the refrigeration system.

4,020,648

CONSTANT VELOCITY TORQUE TRANSMITTING JOINT

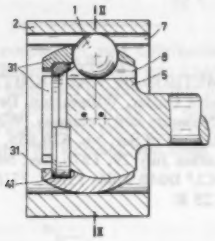
Werner Krude, Neunkirchen, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach (Main), Germany

Filed Dec. 5, 1975, Ser. No. 638,063

Claims priority, application Germany, Dec. 23, 1974, 2461226

Int. Cl. F16d *3/30*

U.S. Cl. 64—21 **4 Claims**



1. A constant velocity torque transmitting joint comprising an outer joint element having a bore therethrough and a plurality of grooves in the surface of said bore, an inner joint element within said bore and having a plurality of grooves in its outer surface corresponding in number to said outer joint element grooves to define pairs of opposed grooves, a plurality of balls between said joint elements with each ball being in a pair of opposed grooves, a cage between said joint elements and having a plurality of openings therein to retain said balls in a plane which is perpendicular to the axis of the cage and which bisects the angle between the joint elements, said cage having a first spherical surface on its outer face and a second spherical surface on its inner face, means on the inner face of said outer joint element coacting with said cage first spherical surface for guiding said cage with respect to said outer joint element, said inner joint element having convex spherical outer surface means for coacting with said cage second spherical surface, the centers of said first and second cage spherical surfaces being equidistant on opposite sides of said ball plane, said cage comprising a plurality of segments each receiving at least one of said balls, and means for radially supporting said segments with respect to each other.

4,020,649

BRILLIANTIZED STEP CUT DIAMOND

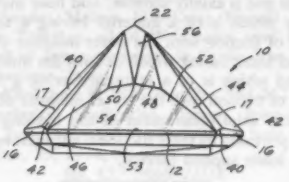
Henry Grossbard, 552 Beach 132nd St., Belle Harbor, N.Y. 11694

Filed May 27, 1976, Ser. No. 690,401

Int. Cl.² A44C *17/00*

U.S. Cl. 63—32 **8 Claims**

1. A brilliantized step cut diamond comprising: a straight edged polygonal shaped girdle with a plurality of side facets and corner facets; a crown, said crown having a girdle break, a table break and a table, said table break being cut with triangular shaped facets and said girdle break being cut with quadrilaterally shaped facets; and a pryamidal base, said pyramidal base having a girdle break, a culet break, a point culet and a plurality of ridges, each of said ridges extending from said culet toward a corner, a fan of at least three pairs of triangular halves symmetrically disposed about each ridge of said pyramidal base, a kite shaped facet on each side of the base on the culet break and disposed between each fan, and a shield shaped facet on each side of the base on the girdle break, each shield shaped facet having a base line parallel to



the girdle and an apex in contact with a point of the associated kite shaped facet.

4,020,650

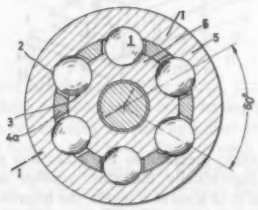
CONSTANT VELOCITY UNIVERSAL JOINT AND BALL GROOVES THEREFOR

Werner Krude, Neunkirchen, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach (Main), Germany

Filed Jan. 12, 1976, Ser. No. 648,380

Int. Cl. F16d *3/30*

U.S. Cl. 64—21 **2 Claims**



1. A constant velocity universal joint comprising an outer joint member having a bore therethrough and a plurality of grooves in the surface of said bore, an inner joint member within said bore and having a plurality of grooves in its outer surface corresponding in number to and opposed from said outer joint member grooves to define pairs of opposed grooves, said grooves being one of parallel to the axis of rotation of the joint and curved such that a plane through the central line of each groove passes through the axis of the joint, a plurality of balls between said joint members with each ball being in a pair of opposed grooves, a cage between said joint members and having a plurality of openings therein to retain said balls in a plane which is perpendicular to the axis of the cage and which bisects the angle between the joint members, the number of said balls being at least six and is divisible by a whole number larger than one but less than the number of said balls, said balls being so positioned around the axis of the joint such that no one ball is diametrically opposed from any other ball.

4,020,651

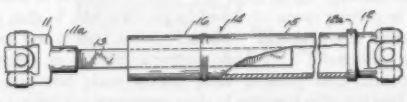
TELESCOPING DRIVE LINE

Fritz A. Callies, Menomonee Falls, Wis., assignor to Rexnord Inc., Milwaukee, Wis.

Filed July 3, 1975, Ser. No. 593,132

Int. Cl. F16d *3/06*

U.S. Cl. 64—23 **9 Claims**



1. In a telescoping drive shaft assembly comprising an outer

member having a noncircular axial bore, a non-circular inner member, and a liner having a sliding fit within the bore of said outer member and having an axial bore in which said inner member fits and is axially slidable, said liner including (1) an outer body which is of a material having a relatively high coefficient of friction with the outer member of at least 0.3 and (2) and inner facing which defines the inner bore of the bushing and which is of a material having a relatively low coefficient of friction with the innter member of less than 0.1 such that the axial securement of the bushing in the outer member is provided by their frictional engagement effected by the torque loads applied thereto.

4,020,652

SELECTOR MECHANISMS

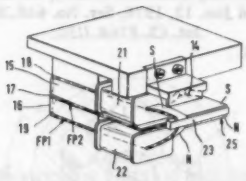
Sidney Clifford Savage, Leicester, England, assignor to Wildt Mellor Bromley Limited, Leicester, England

Filed Dec. 10, 1975, Ser. No. 639,584

Claims priority, application United Kingdom, Dec. 24, 1974, 55698/74

Int. Cl.² D04B *15/78*

U.S. Cl. 66—50 R **8 Claims**



1. In a selection mechanism for a knitting machine of the type having individual'y movable needles associated with selection butts at at least two levels: the improvement that the selection mechanism comprises at least one pair of superimposed permanent magnets, a common pole piece between the said pair of magnets with opposite pole faces of magnets directed towards said common pole piece, a pair of individual pole pieces extending from the other pole faces of the said pair of magnets to form selectors at two different butt levels closely spaced on either side of the common pole piece, and individual selector coils on the said individual pole pieces and adapted to be individually pulsed to divert the magnetic field of the permanent magnet in the pole piece so as to negate its effect on the butts and effect a selection.

4,020,653

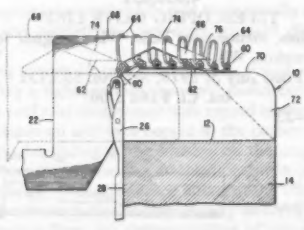
SINKER TOP CIRCULAR KNITTING MACHINE FOR PRODUCING LOOP FABRIC

Lester Mishcon, Miami Beach, and Donald William Reagan, Hialeah, both of Fla., assignors to The Singer Company, New York, N.Y.

Filed Feb. 10, 1976, Ser. No. 656,779

Int. Cl.² D04B *27/04*

U.S. Cl. 66—93 **8 Claims**



1. In a circular knitting machine for forming loop fabric the combination comprising a plurality of sinkers each with a nib, an upper knitting edge extending to the nib and a lower knitting edge below the nib, a plurality of latch type needles alternating between adjacent sinkers, means for moving needles between a latch clear and a cast-off position, means for feeding loop yarns above the upper knitting edge of the sinkers and base yarns below the sinker nibs, means for moving the sinkers in one direction to a position such that long loops may be formed over said upper knitting edge of the sinkers while base yarn is knit over the lower knitting edge and for moving the sinkers in the opposite direction thereby freeing the long loops from the sinker nibs, means for holding the fabric above the said lower knitting edge of the sinkers and each sinker nib having an edge extending downwardly from its upper knitting edge such that when a sinker is moved in the said one direction the sinker nib re-enters previously formed loops of the fabric held above the lower knitting edge causing them to ride up the nib whereby such loops are stretched and straightened.

4,020,654

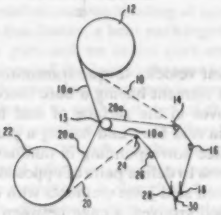
METHOD OF WARP KNITTING

Bharat Jaybhadra Gajjar, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 620,835, Oct. 8, 1975. This application July 29, 1976, Ser. No. 709,660

Int. Cl.² D04B *3/06, 15/48, 27/10, 35/00*

U.S. Cl. 66—125 R **16 Claims**



1. In a method for producing warp-knitted fabrics on a warp-knitting machine having at least two sets of warp threads and corresponding operating guide bars, including the steps of feeding one of said two sets of threads to one of two operating guide bars of said warp-knitting machine and feeding the other of said two sets to the other operating guide bar of said warp-knitting machine to form a knitted fabric, the improvement comprising: interchanging some of the threads from said one set of threads with threads of the other of said set of threads in a spaced pattern ahead of said operating guide bars on said knitting machine.

4,020,655

DEVICE FOR DETECTING DEFECTS IN NEEDLES ON A KNITTING LOOM WHICH IS IN OPERATION

Jean-Pierre Raisin, Troyes, and Bernard Helffer, Saint Andre les Vergers, both of France, assignors to Centre Technique Industriel dit: Institut Textile de France, Boulogne sur Seine, France

Filed Jan. 20, 1976, Ser. No. 650,693

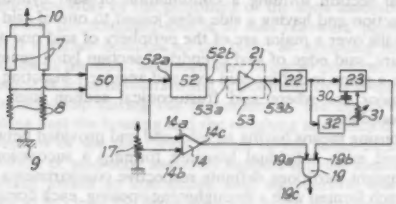
Claims priority, application France, Jan. 22, 1975, 75.01987

Int. Cl.² D04B *35/18*

U.S. Cl. 66—157 **6 Claims**

1. A device for detecting defects in needles on a knitting loom which is operating, comprising at least one magnetic detector mounted such that the needles all pass successively in front thereof during their working movement, said magnetic detector being constituted by at least one Hall probe having an active surface of a width less than the thickness of the needles to be detected, a first electronic circuit connected to the magnetic detector and including a first comparator for detect-

ing signals produced by said magnetic detector whose amplitude is greater than a predetermined value and to provide a first control signal for stopping the loom in response to this detection, and a second electronic circuit comprising a differentiation circuit connected to said magnetic detector for differentiating the signals produced by said magnetic detector,



a shaper circuit coupled to said differentiation circuit for converting the differentiated signals into a sequence of pulses whose recurrence frequency is equal to that of said differentiated signals, and a detector circuit for detecting a missing pulse in the signal supplied by said shaper circuit to provide a second control signal for stopping said loom.

4,020,656

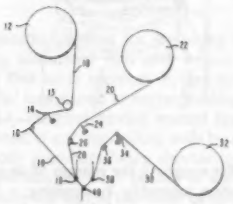
METHOD OF WARP KNITTING

Bharat Jaybhadra Gajjar, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 620,832, Oct. 8, 1975, abandoned. This application July 29, 1976, Ser. No. 709,659

Int. Cl.² D04B *23/00*

U.S. Cl. 66—213 **13 Claims**



1. In a method for producing warp knitted fabrics on a warp knitting machine having two full sets of warp threads, including the steps of feeding one of said two full sets of threads to each position of one of two operating guide bars and then to each needle of said warp knitting machine and feeding the other of said two full sets to each position of the other operating guide bar and to each needle of said warp knitting machine to form a knitted fabric, the improvement comprising: feeding a partial beam set of threads to spaced positions of at least one of said guide bars and then to spaced needle for knitting together with one of said full sets of threads, whereby spaced double threads are knitted as a combined single thread, said partial beam set of threads being fed with respect to said one of said full set of threads to provide a ratio R of less than about 1.3.

4,020,657

PRESSURE SEAL APPARATUS FOR A HIGH PRESSURE STEAMER

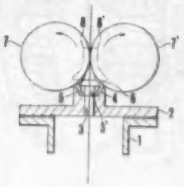
Yoshikazu Sando; Matsuo Minakata; Hiroshi Ishidoshiro; Masanobu Tomatsu, all of Wakayama, and Isao Kamei, Kainan, all of Japan, assignors to Sando Iron Works Co., Ltd., Wakayama, Japan

Filed June 6, 1975, Ser. No. 584,262

Claims priority, application Japan, June 10, 1974, 49-65816; June 12, 1974, 49-66946; June 12, 1974, 49-66947; Dec. 25, 1974, 50-4767

Int. Cl.² D06B *23/18*

U.S. Cl. 68—5 E **1 Claim**

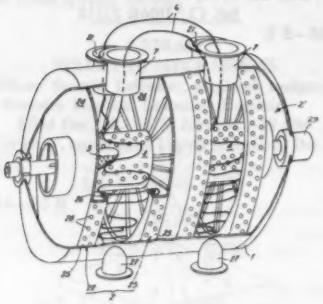


1. A pressure seal apparatus for a high pressure steamer, comprising a high pressure vessel body having a feed-in opening and a take-out opening for passing a fiber product into and out of of said body, a seal block fixed to each of said feed-in opening and take-out opening and forming an upwardly extending passage therethrough, said passage being rectangular in horizontal section with two long sides and two short sides, the upper ends of the long sides of said passage through said seal block being recessed outwardly, an elastic sealing member fitted into the recessed upper ends of said seal block and having an upper part projecting upwardly above the upper end of said seal block, a fixing member removably located within the recessed upper end of said sealing block inwardly of said sealing member and removably securing said sealing member to said seal block, said fixing member having inner surfaces defining a continuation of the passage through said seal block, a pair of rotatable seal rolls positioned above said seal block and disposed in contact with one another to form a nip aligned above the passage through said seal block and fixing member, the axis of said seal rolls extending in generally parallel relation with the long sides of said passage, the upper part of said sealing member forming a sealing lip along each long side of said passage and said sealing member and having a first surface facing inwardly toward the upward projection of said passage and an oppositely directed second surface with said second surface disposed in surface contact with the circumferential surface of the adjacent said seal roll, said first and second surfaces of said upward part of aid sealing member being disposed in spaced relation at the upper end of said seal block and tapering inwardly toward one another in the upward direction therefrom and terminating in a sharp pointed free end spaced above the upward end of the said seal block and pointing in the direction out of said vessel body, an end seal assembly located above each short end of said passage and disposed in pressure contact with each of the opposite transverse ends of said seal rolls and with the upper portion of said sealing lips of said sealing member, each said seal assembly comprises an end plane sealing plate and a lubricating sheet with said end plane sealing plate pressing said lubricating sheet against the transverse ends of said seal rolls and said end plane sealing plate disposed in pressure contact with the upper transverse ends of said sealing lips.

4,020,658
APPARATUS FOR WET-TREATING FABRICS

Alfred Thies, Jr., 56 Gerlever Weg, D-4420 Coesfeld, Germany

Filed May 5, 1975, Ser. No. 574,305
Claims priority, application Germany, May 4, 1974, 2427415
Int. Cl.² D06B 3/24, 3/28
U.S. Cl. 68—5 C 20 Claims

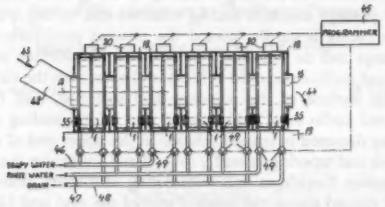


1. An apparatus for wet-treating, particularly for dyeing, a fabric in the form of a continuous circulating rope of cloth, comprising a kier for taking up a considerable length of rope of cloth, a feeding-in device for the introduction of the rope of cloth into the kier by means of a treatment liquid, a circulating pump for the treatment liquid having its suction side fitted onto the kier and its pressure side fitted onto the feeding-in device, a drum rotatably mounted in the interior of the kier, said drum having a wall including throughpassage means for introducing the rope of cloth interiorly of said drum, the rope of cloth, by means of said feeding-in device, being introduced exclusively into said drum and means for enabling the treatment liquid to pass from the inside of the drum into that part of the interior of the kier which is situated outside the drum.

4,020,659
TUNNEL-TYPE COMMERCIAL-DUTY WASHING MACHINE

Guy Michel Bhavsar, 68, boulevard des Belges, Lyon, Rhone, France

Filed July 2, 1975, Ser. No. 592,673
Claims priority, application France, July 4, 1974, 74.23898
Int. Cl.² D06F 21/04, 31/00, 37/06
U.S. Cl. 68—27 9 Claims



1. An apparatus for treating a textile article with a liquid, said apparatus comprising:

at least one drum rotatable about a horizontal axis and provided with an outer wall defining a chamber and with a pair of axially spaced end walls flanking said chamber and each formed at said axis with a respective aperture;

scoop means in said drum effective on rotation thereof through more than a predetermined angle for lifting from said outer wall and axially displacng said article out of said chamber through one of said apertures and ineffective on oscillation of said drum through less than said predetermined angle for lifting said article;

drive means for oscillating and rotating said drum about said axis, said scoop means being at least partially foraminous and formed from a first generally cylindrical section having an edge attached to said outer wall and extending between said end walls and a second generally frustoconical section forming a continuation of said cylindrical section and having a side edge joined to one of said end walls over a major arc of the periphery of said one aperture, said edge of said cylindrical section lying generally in a plane including said axis and angularly bisecting said major arc where said frustoconical section joins said periphery;

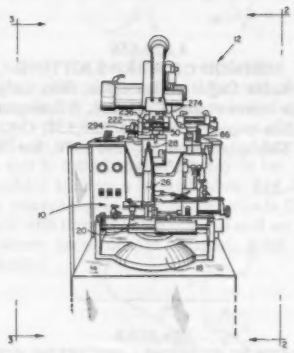
a housing means having an inlet end and provided between said ends individual housings forming a succession of upright partitions defining respective compartments and each formed with a throughgoing opening, each compartment being provided with one such drum, said drums being coaxial with said axis passing through said openings, each frustoconical section being joined to that end wall of the respective drum turned toward said outlet end; and

means for introducing treatment fluids into said compartments said drums being at least partially foraminous.

4,020,660
ROUGHING MACHINE HAVING TOOL POSITION ADJUSTING MECHANISM

Normand Bergeron, Boucherville, Canada, assignor to International Shoe Machine Corporation, Nashua, N.H.

Continuation of Ser. No. 608,616, Aug. 28, 1975, abandoned.
This application June 8, 1976, Ser. No. 694,005
Int. Cl.² C14B 1/44; A43D 95/00
U.S. Cl. 69—6.5 13 Claims



1. A machine for roughing the margin of an upper of a shoe assembly, said shoe assembly comprising a last having an insole located on its bottom and the upper mounted thereon with the upper margin lying against and being secured to the periphery of the insole, comprising: a frame; a housing mounted for forward-rearward movement with respect to the frame; a roughing tool mounted to the housing for forward-rearward movement with respect to the housing; drive means for moving the roughing tool between forward and rearward positions with respect to the housing; a table; a slide mounted to the table for movement with respect to the table; a shoe assembly support mounted to the slide for supporting the shoe assembly bottomup; shoe assembly support moving means that includes means for moving the slide with respect to the table to thereby move portions of the upper margin past the housing and the roughing tool; operating means effective during said movement of the upper margin portions past the housing to so move the housing forwardly and rearwardly as to

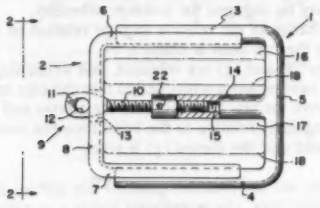
maintain the housing in a prescribed forward-rearward relationship with respect to the periphery of the side of the shoe assembly moving past the housing thereby enabling the roughing tool to engage the upper margin a relatively great distance inwardly of the periphery of the shoe assembly bottom when the roughing tool is in said forward position and to enable the roughing tool to engage the upper margin a relatively small distance inwardly of the periphery of the shoe assembly bottom when the roughing tool is in said rearward position; a control member mounted to the table; an actuating member mounted to the slide; said members being so constructed and arranged as to be in intersecting relationship or non-intersecting relationship during the movement of the upper margin portions past the housing and the roughing tool caused by the movement of the slide with respect to the table during the operation of said shoe assembly support moving means; and adjusting means so connecting said members to the drive means as to cause the drive means to place the roughing tool in one of said positions when said members are in non-intersecting relationship and to place the roughing tool in the other of said positions when said members are in intersecting relationship.

4,020,661

SKI LOCK APPARATUS

Edward L. Rich, 3980 Peppermill Lane, Bay City, Mich. 48706

Filed Oct. 20, 1975, Ser. No. 624,069
Int. Cl.² E05B *73/00*
U.S. Cl. 70—58 **7 Claims**



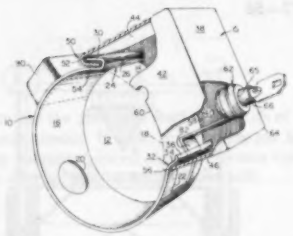
1. Lock apparatus adapted for mounting on a pair of skis and comprising assembled first and second U-shaped body members, said first body member having spaced apart, substantially parallel legs joined at corresponding ends by a web, said second body member having spaced apart, substantially parallel legs joined at corresponding ends by a web, the legs of each of said body members being shorter in length than the width of the said skis, the legs of one of said body members slidably embracing the legs of the other of said body members, and said webs being spaced apart by the legs of said body members, the combined lengths of the respective legs being at least as great as the width of said skis; an elongate anchor member rigidly fixed to one of said webs between the legs of the latter and projecting from said one of said webs toward the other of said webs, said anchor member having a length less than that of the legs of said one of said webs, said other of said webs having an opening therein in alignment with said anchor member; an elongate latchbolt one end of which is in threaded, axially adjustable engagement with said anchor member and extending in prolongation thereof toward said other of said webs; and a head carried by said latchbolt at its outer end and extending through said opening in said outer of said webs, said web being of such size and shape relative to said opening as to be slidably but non-rotatably accommodated in said opening.

4,020,662

SHACKLE FOR SECURING VEHICLE STEERING COLUMN IGNITION LOCK AGAINST BURGLARY

Harry H. Fowler, 70 Fresh Pond Parkway, Cambridge, Mass. 02138

Filed Aug. 22, 1975, Ser. No. 606,962
Int. Cl.² B60R *25/00;* **H01H** *9/28*
U.S. Cl. 70—237 **2 Claims**



1. A security device for association with the steering column ignition lock of an automotive vehicle, said security device comprising:

a. a collar for connection to said steering column, said collar having an arcuate portion, a gap for access to said ignition lock, a first connector and a second connector at said gap;

b. a cap for covering said gap when secured and for uncovering said gap when unsecured, said cap having a third connector for engaging said first connector of said collar and a chamber that is registered with said gap when said cap is secured;

c. a lock carried by said cap, said lock having a fourth connector under the control of a key, said fourth connector being engaged with said second connector when secured and being disengaged from said second connector when unsecured;

d. when said security device is in locked condition, said first connector and said third connector projecting in one direction, and said second connector and said third connector projecting in the opposite direction;

e. said first connector and said second connector being affixed to said collar;

f. said third connector being affixed to said cap;

g. said lock including a cylindrical key receptacle, a cylindrical key, a rotatable shaft controlled by said key, and a foot mounted on said rotatable shaft, said foot engaging said second connector when said collar and said cap are in locked condition;

h. said cap enclosing said first connector and said second connector when said collar and said cap are locked;

i. said first connector including an intermediate bight portion and a flange portion and said second connector including an intermediate bight portion and a flange portion, said flange portion of said first connector and said flange portion of said second connector extending in the same direction;

j. said third connector means including a bight portion and a flange portion, said flange portion of said third connector and said foot portion of said lock extending in the same direction when said collar and said cap are in locked condition.

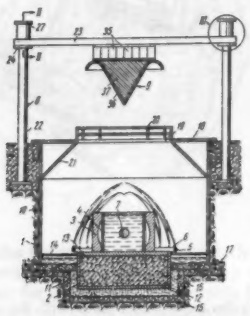
4,020,663
PLANT FOR EXPLOSIVE FORMING

Alexei Alexeevich Gubsky, ulitsa Ekonomicheskaya, 7, kv. 13; Vladimir Karpovich Borisevich, ulitsa Chkalova, 15, kv. 17; Anatoly Ivanovich Volkov, ulitsa Chkalova, 15, kv. 36, and Valery Matveevich Molchanjuk, pereulok Shexpira, 3, kv. 8, all of Kharkov, U.S.S.R.

Continuation of Ser. No. 587,211, June 16, 1975, abandoned, which is a continuation of Ser. No. 519,034, Oct. 29, 1974, abandoned, which is a continuation of Ser. No. 429,395, Dec. 28, 1973, abandoned. This application Feb. 23, 1976, Ser. No. 660,393

Int. Cl.² B21D *26/08*

U.S. Cl. 72—56 6 Claims



1. A plant for explosive-forming articles of different size comprising a vessel; a die having means mounting a blank secured thereto, said die being located in said vessel; means for accommodating a liquid medium in said vessel; the liquid medium contained in said means being arranged to transmit the energy of detonation to said blank; an explosive charge placed into the liquid medium enclosed in said means; an exposed support separate from and independent of said vessel, located near said vessel but not conncted thereto; a splitter for disecting a liquid medium column formed by said exposed support separate from and independent of said vessel located near said vessel; a splitter for disecting a liquid medium column formed by an explosion, said splitter being fixedly mounted and exposed above said vessel on said support; and a shock absorber arranged intermediate said support and splitter and means adapted to connect the support and shock absorber.

4,020,664
DEVICE FOR ADJUSTING THE PHASE OF ROLL DIES IN A CROSS-ROLLING MACHINE

Mokuji Koizumi, and Yukitsugu Kobayashi, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 15, 1975, Ser. No. 640,566

Claims priority, application Japan, Jan. 10, 1975, 50-4899

Int. Cl.² B21B *31/16*

U.S. Cl. 72—108 5 Claims

1. Apparatus for adjusting the phase between roll dies in a cross-rolling machine that includes a die roll having a roll shaft extending axially therefrom, said apparatus including:

a. an annular boss coaxially received on said roll shaft;

b. means securing the boss to the roll shaft for rotation with said roll shaft;

c. a drive gear coaxially received on said roll shaft;

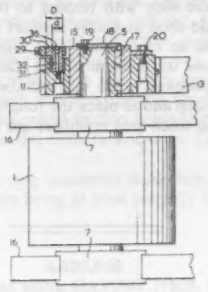
d. means releasably securing the drive gear to the boss and arranged to provide, when released, limited angular movement between the drive gear and the boss, whereby the drive gear may be angularly adjusted relative to the roll shaft by releasing said releasably securing means, moving the drive gear angularly relative to the boss to the desired degree, and resecuring said releasable securing means;

e. said boss including means defining a radially outwardly opening groove;

f. a bracket radially slidably mounted in said groove;

g. means for releasably adjustably fixing the bracket to the boss, whereby the relative radial relation of the bracket to the groove may be adjusted by releasing said fixing means, moving the bracket radially the desired amount and refixing said fixing means;

h. means providing an axially extending cavity in the bracket intermediate the radial extent of the bracket, said cavity having an axially extending peripheral sidewall;



i. cam means received in the cavity and journalled by eccentric cam shaft on the drive gear, with an offset from the geometric center of said peripheral sidewall, for rotation in contact with said peripheral sidewall;

j. said cam means having means providing an externally accessable wrenching surface thereon wherewith said cam may be engaged for rotation; whereby,

when a change in the relative angular relation of the drive gear to the roll shaft is desired,

the means (d) and (g) are released, said wrenching surface of said cam means is wrenched to turn the cam means and thus move the bracket radially in the groove and the drive gear angularly relative to the boss, then the means (d) is resecured and the means (g) is reset.

4,020,665
DEVICE FOR HOLDING RAW MATERIAL IN A CROSS-ROLLING MACHINE

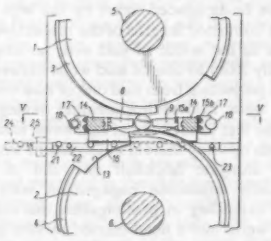
Mokuji Koizumi, and Yukitsugu Kobayashi, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1975, Ser. No. 635,782

Claims priority, application Japan, Jan. 10, 1975, 50-5390[U]

Int. Cl.² B21B *39/02;* B21D *13/04*

U.S. Cl. 72—108 7 Claims



1. In a cross-rolling machine, in which a raw material workpiece is forceably rotated by being held between two rolls

rotatably mounted generally parallel to one another to extend transversally on a machine frame and which has forming dies on their radially outer peripheries which rollingly and deformingly contact the workpiece,

a workpiece holding device, comprising:

guide track means extending longitudinally on the machine frame;

a pair of guide boards, including one arranged to be disposed forwardly of and the other arranged to be disposed behind the workpiece when said machine is in use;

frame assembly means including guide bar means each mounted for forward and rearward movement along said guide track means;

said guide boards being secured on said frame assembly means, so that the respective guide boards may be moved relative to the rolls by moving the respective guide bar means of the respective frame assembly means along the respective guide track means.

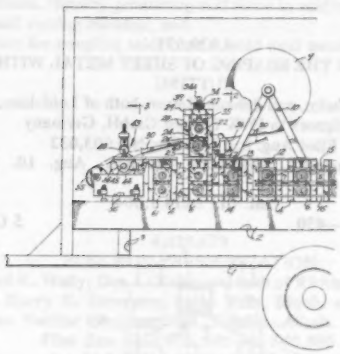
4,020,666
MOBILE FORMING MACHINE WITH EMBOSSING ROLLS

Glen E. Beymer, 83363 N. Enterprise, Creswell, Oreg. 97426

Filed Apr. 15, 1976, Ser. No. 677,156

Int. Cl.² B21D *5/06*

U.S. Cl. 72—177 6 Claims



1. In a mobile roll forming machine for the production of metal siding at a siding installation site, said machine having roll sets stationed along the path of a run of light gauge metal stock, the improvement comprising,

a set of embossing rolls between which the metal stock may pass,

adjustment means associated with each end of an embossing roll to vary embossing roll spacing, and

guide means for diverting the moving metal stock out of embossing roll engagement enabling the optional production of unembossed metal siding.

4,020,667
TUBE ROLLING

Werner Demny, and Hermann Möeltner, both of Dusseldorf-Oberkassel, Germany, assignors to Firma Friedrich Kocks, Dusseldorf, Germany

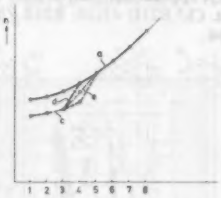
Filed Oct. 23, 1975, Ser. No. 624,880

Claims priority, application Germany, Oct. 23, 1974, 2450224

Int. Cl.² B21B *17/00*

U.S. Cl. 72—205 9 Claims

1. A multistand rolling mill for stretch-reducing tubes comprising a plurality of successive stands of rolls along a pass line, drive means for driving said rolls so that the peripheral speed of the rolls increases from stand to stand from inlet to outlet end of the pass line, the stands at the inlet end being stands in which tension is built, means acting on the rolls of at least one of said stands adjacent the inlet end in which tension is being built up individually varying the rotation speed of the rolls in said at least one stand whereby a rotational speed step



is built up between the rolls of at least two stands of those inlet stands in which tension is built up, and means for shifting selectively the rotational speed change between the two front stands to the inlet and outlet ends of said mill.

4,020,668
DRAW PRESS

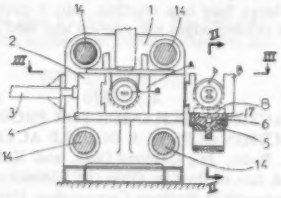
Michel Doudet, Jouy-en-Josas, France, assignor to Secim, Courbevoie, France

Filed Sept. 25, 1975, Ser. No. 616,893

Claims priority, application France, Oct. 22, 1974, 74.35362

Int. Cl.² B21C *25/02*

U.S. Cl. 72—285 4 Claims



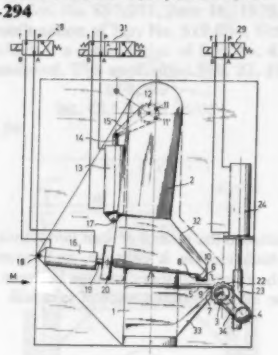
1. A draw press comprising a bed; a press die-stock; a slide movable perpendicularly to the axis of the press between first and second positions; means for coupling said press die-stock to said slide, said press die-stock being positioned in an operative position on the press axis in the first position of said slide and spaced laterally from the press axis in the second position thereof; a die-stock changing device at the second position of said slide, said device including: a table contiguous with said bed; a carriage for supporting a replacement die-stock, spaced laterally from the press axis, and movable on said table in a direction parallel to the press axis between an inoperative position and an operative position for coupling said replacement die-stock to said slide, the disengagement of said press die-stock coupled to said slide being caused by movement of said carriage from the inoperative to the operative position; wherein said die-stock changing device includes means for sliding the disengaged press die-stock along said movable carriage, and means for fixing said die-stocks relative to said carriage.

4,020,669

MACHINE FOR BENDING BAR OR ROD MATERIAL

Hans Gött, and Josef Ritter, assignors to Firma Evg Entwicklungs-u Verwertungsgesellschaft, Graz, Austria; Klaus Ritter and Gerhard Ritter, all of Graz, Austria

Filed Apr. 28, 1976, Ser. No. 681,336
Claims priority, application Austria, May 6, 1975, 3467/75
Int. Cl.² B21D *43/28*; B21B *7/024*
U.S. Cl. 72—294 6 Claims



1. A machine for bending bar or rod material, said machine comprising at least one stationary bending mandrel and one bending tool, said bending tool being pivotable about said mandrel; a pair of clamping cheeks, said cheeks being positioned directly in front of said bending mandrel in the direction of the feed path of said bar or rod material and said cheeks each including a clamping face, said clamping face arranged substantially parallel with said feed bar, and a cutting face, said cutting face being arranged substantially perpendicular to said respective clamping face, said cutting faces and said clamping faces intersecting to form cutting edges substantially parallel with one another, said clamping cheeks also being movable relative to one another in a direction substantially parallel with said feed path whereby said clamping cheeks may be relatively displaced from a clamping position in which their respective cutting edges are offset and their clamping faces face one another, into a cutting position in which said cutting edges are aligned and said clamping faces are offset.

4,020,670

TRIPLE ACTION MECHANISM FOR PRODUCING HIGH REDUCTION CUPS IN A DOUBLE ACTION PRESS

Joseph D. Bulso, Jr., Canton, Ohio, and Robert T. Hipple, deceased, late of Dayton, Ohio (by Glendora Hipple, executrix), assignors to Redicon Corporation, Canton, Ohio

Filed Mar. 19, 1976, Ser. No. 668,506
Int. Cl.² B21D *22/28*
U.S. Cl. 72—349 8 Claims

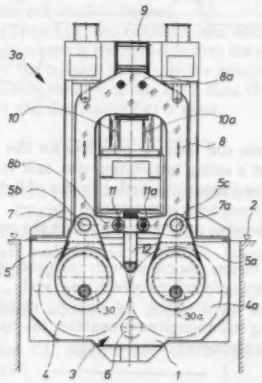
1. High reduction cupping apparatus comprising a housing having an opening extending vertically therethrough, a redraw horn assembly centrally mounted in the opening for reciprocation therein, fluid pressure cushion means within the upper portion of the housing, a cylindrical draw horn and pressure sleeve fitting around the redraw horn assembly and having its upper portion engageable by fluid pressure cushion means, annular pressure means positioned within the housing and around the redraw horn assembly immediately below the fluid pressure cushion means, a pressure ring reciprocably carried in the lower end of the housing and fitting around the lower end of the draw horn, the annular pressure means engaging and applying pressure to the pressure ring, an annular cutter fixedly mounted on the lower end of the housing and surrounding the lower end of the pressure ring, a stationary die holder positioned beneath the lower end of the housing, said die holder having a central vertically extending hole therethrough aligned with the opening in the housing, a blank and draw die mounted in the upper portion of the die holder concentrically with the aforementioned hole, said blank and draw die having an external diameter slightly less than that of the annular cutter so that a shearing action may take place therebetween, the inner diameter of the blank and draw die being sized to receive the draw horn in the drawing operation, the redraw horn assembly including a redraw horn mounted on the bottom of a redraw riser, a redraw die mounted in the die holder concentrically with the hole in the die holder, said redraw die being sized to receive the redraw horn in the redrawing operation, power means connected to the housing and redraw horn assembly to provide the timed movement of the housing and the redraw horn assembly in the combined drawing operation, and pneumatic pressure sources adapted for connection to the fluid pressure cushion means and the annular pressure means, said apparatus being adapted to receive a metal strip between the annular cutter and pressure ring on the upper side and the blank and draw die on the bottom side.

4,020,671

PRESS FOR THE SHAPING OF SHEET METAL WITHOUT CUTTING

Heinz Oberheim, and Johann Katzer, both of Lohfelden, Germany, assignors to IWK Pressen GmbH, Germany

Filed Aug. 8, 1975, Ser. No. 603,032
Claims priority, application Germany, Aug. 10, 1974, 2438494
Int. Cl.² B21J *13/04*
U.S. Cl. 72—450 5 Claims

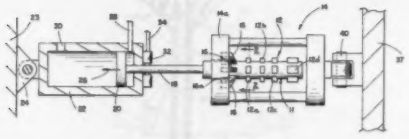


1. In a press for the shaping of metal sheet without cutting, of the type including a press plunger, driving means beneath the press, and connection means connecting the driving means to the press plunger to reciprocate the latter, with the driving means being constituted by at least two oppositely rotating crank means transmitting, through the connection means, a common rectilinear vertical reciprocation to the press plunger, the improvement comprising, in combination, connecting rods connected to said oppositely rotating crank means; at least one laterally closed press frame connected at one end to a respective pair of said connecting rods and at the other end to said press plunger, and constituting said connection means; and guide means guiding each press frame in the direction of reciprocation of said press plunger.

4,020,672
MECHANICAL FORCE PULSE GENERATOR FOR USE IN STRUCTURAL ANALYSIS

Frederick B. Safford, Palos Verdes Estates, Calif., assignor to Agbabian Associates, El Segundo, Calif.

Filed Oct. 9, 1973, Ser. No. 404,136
Int. Cl.² G01N 3/30
U.S. Cl. 73—12 17 Claims



1. In a device for generating a force having a predetermined force-time pattern in a load member comprising:

a mandrel having a series of separate and distinct projections formed thereon, said projections being dimensioned, shaped and spaced from each other on said mandrel so as to represent said force-time pattern,

a cutter member for engaging said projections in succession,

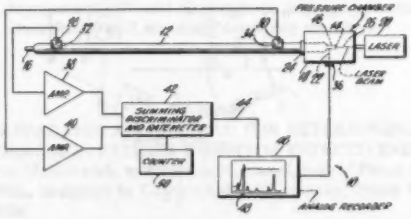
drive means for causing said cutter member to shear off at least a portion of said projections in succession in a single stroke, thereby generating said force in said mandrel and said cutting member, and

means for coupling said force to said load member.

4,020,673
FUEL ROD PRESSURIZATION

Richard K. Welty; Dan L. Robinson, both of Richland, Wash., and Harry R. Deveraux, Idaho Falls, Idaho, assignors to Exxon Nuclear Company, Inc., Bellebue, Wash.

Filed Jan. 14, 1975, Ser. No. 540,895
Int. Cl.² G01M 19/00; G21C 19/12
U.S. Cl. 73—37 16 Claims

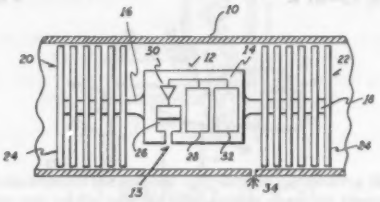


1. A system for verifying the pressurization of a fuel rod adapted for use in a nuclear reactor comprising, in combination, said fuel rod having one end thereof disposed in a pressure chamber for pressurizing said fuel rod; acoustic transducer means operably attached to said fuel rod for detecting sonic vibrations in said fuel rod; pressure transducer means operably connected to said pressure chamber for sensing the status of pressure in said pressure chamber; and output means connected to said acoustic transducer means and to said pressure transducer means for receiving signals from said acoustic and pressure transducer means respectively, for providing comparison to determine and verify pressurization of said fuel rod.

4,020,674
PIPELINE LEAK DETECTOR WITH BAFFLES

Harry Robert Fechter, 2298 Capistrano, Las Vegas, Nev. 89121, and George Brown Walker, 118115 93rd Ave., Edmonton, Alberta, Canada

Filed May 19, 1976, Ser. No. 688,071
Int. Cl.² G01M 3/28
U.S. Cl. 73—40.5 R 6 Claims



1. An apparatus for the detection of leaks in pipelines comprising:

a. An elongate body portion adapted to move axially within the pipeline,

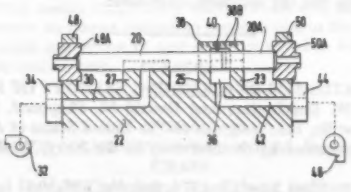
b. A pair of spaced baffles supported by said body portion, each comprising a plurality of axially spaced circular discs of a diameter less than the internal diameter of the pipeline,

c. Said baffles defining there between an intermediate chamber and a pressure sensor supported by said body portion for indication of a decrease in chamber pressure as the detection apparatus passes a pipeline leak.

4,020,675
MANUFACTURE OF CIGARETTES

Ivan Y. Hirsh, London, England, assignor to Molins Limited, England

Filed Jan. 13, 1975, Ser. No. 540,345
Claims priority, application United Kingdom, Jan. 18, 1974, 2592/74
Int. Cl.² G01M 3/26
U.S. Cl. 73—41 11 Claims

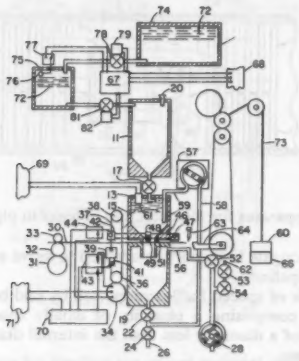


1. A testing device for filter-tipped cigarettes comprising a first source of pressure different from atmospheric pressure arranged to be connected to at least one end of each cigarette to be tested, to produce an air flow through the wrapper of the cigarette, means for monitoring the air flow to detect the presence of an excessively leaky wrapping, means for defining a chamber around the cigarette solely in the region of the joint between the filter and the tobacco-filled part of the cigarette including sealing means movable with the cigarettes during testing for substantially sealing the ends of the said chamber around the cigarettes and means for connecting the chamber to a second source of pressure of opposite sense with respect to said first source.

4,020,676
METHOD AND APPARATUS FOR COLLECTING FLUID CONTAMINANTS

Orville Gene Nuxhall, and Donald Thomas Carlton, both of Fort Wayne, Ind., assignors to The Magnavox Company, Fort Wayne, Ind.

Filed Oct. 2, 1975, Ser. No. 619,082
Int. Cl.² G01N 15/04
U.S. Cl. 73—61 R 4 Claims



1. An apparatus to collect and concentrate dissolved constituents from a known volume of fluid, comprising: a first container to receive the known volume of fluid and having an outlet; an ion exchange material positioned at the outlet of the first container so that all the fluid leaving the first container passes through the ion exchange material; a second container to receive the fluid from the first container; reversible means to move the first container and the second container together thereby fixedly holding the ion exchange material in place; a vacuum generating means to create a vacuum in the second container, the second container having an inlet extending into the interior so that a vacuum outlet located near the wall having the inlet does not withdraw the fluid being sampled; means to recirculate the fluid from the second container back to the first container to allow the fluid to pass through the ion exchange material again to extract additional dissolved constituents; a sensor detects disappearance of fluid in the first container and in turn disables the vacuum generating means; and means to introduce deionized water into the measuring container after contaminated fluid has been drained from the apparatus, the deionized water being provided to flush the containers and the means to recirculate.

4,020,677
APPARATUS FOR DETERMINING SALINITY OF FLUIDS

Harold W. Doddington, and Donald M. Sheppard, both of Gainesville, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 17, 1976, Ser. No. 697,304
Int. Cl.² G01N 27/08
U.S. Cl. 73—61 R 5 Claims

1. An instrument for determining salt concentrations in fluid comprising,

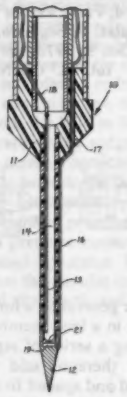
a probe having a chamber therein,

a narrow vertical hole connected with said chamber and a narrow horizontal slit connected with said vertical hole for providing a passageway for admitting fluid into said chamber,

first and second electrodes spaced apart from one another with said second electrode being attached within said chamber,

means for continually drawing fluid through said slit and vertical hole into said chamber,

means for applying a steady state alternating current between said first and second electrodes, and

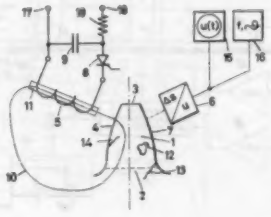


circuit means for measuring the resistance between said first and second electrodes and providing direct current output voltages inversely proportional to the amount of salt in said fluid.

4,020,678
METHOD AND SYSTEM FOR TESTING OF INDIVIDUAL GEAR TEETH

Günter Laue, Petristr. 26, 4920 Lemgo 1, Germany

Filed Jan. 14, 1976, Ser. No. 649,097
Int. Cl.² G01M 7/00
U.S. Cl. 73—67.2 17 Claims



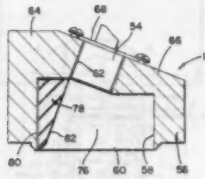
1. System for testing the bending resistance and damping of an individual tooth of a steel gear for detecting defects therein, comprising, in combination, means for creating a pulsed magnetic attractive force for bending said tooth and causing said tooth to execute free flexural vibrations; and sensing means positioned in operative proximity to said tooth for sensing said flexural vibrations and furnishing an electrical signal having a predetermined characteristic varying in correspondence thereto, wherein said means for creating a pulsed magnetic attractive force comprise a capacitor, means for charging said capacitor to a predetermined voltage, a coil, and switch means interconnected between said capacitor and said coil for discharging said capacitor through said coil, thereby creating a surge of magnetic circulation in said coil.

4,020,679

SLED FOR ULTRASONIC NDT SYSTEM

Peter S. Barry, Roxbury, Conn., assignor to Automation Industries, Inc., Los Angeles, Calif.

Filed Aug. 13, 1975, Ser. No. 604,268
Int. Cl.² G01N 29/04
U.S. Cl. 73—67.8 S 7 Claims



1. A device for non-destructively inspecting a workpiece contacted by said device comprising:

a housing having a face on one side thereof for scanning a workpiece,

a chamber in said housing forming an opening in said face,

a diaphragm on said face closing the opening therein,

ultrasonic search unit means mounted on said housing for transmitting and/or receiving a beam of ultrasonic energy, said search unit extending into said chamber,

a liquid acoustical couplant entirely self-contained within said chamber acoustically coupling the search unit to the diaphragm,

an acoustical dampening member having a high acoustical attenuation and acoustical properties matching those of the couplant, said dampening member being mounted in said chamber out of alignment with said search unit with a surface thereof forming an interface between the dampening member and said couplant, said surface being disposed substantially parallel to and immediately adjacent to but outside of the beam of ultrasonic energy transmitted and/or received by said search unit and at an angle with respect to signals reflected off of a workpiece contacted by said diaphragm passing perpendicularly through said diaphragm; and

means for mounting said search unit means to direct ultrasonic energy toward said diaphragm at a significant angle away from the perpendicular to cause ultrasonic energy reflected directly from the surface of a test object in engagement with said diaphragm to impinge upon and be absorbed by said acoustic dampening member.

4,020,680

APPARATUS AND METHOD FOR DETERMINING CORROSION FATIGUE INHIBITOR EFFECTIVENESS

Parviz Mehdizadeh, and Burton M. Casad, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed June 1, 1976, Ser. No. 691,676
Int. Cl.² G01N 17/00
U.S. Cl. 73—86 5 Claims

1. Apparatus for determining the effectiveness of a corrosion fatique inhibitor comprising:

a. a test probe having an evacuatable chamber, said test probe being formed of a metallic material which is permeable to hydrogen atoms;

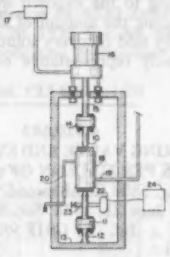
b. holding means for holding one end of said test probe;

c. means for applying a cyclical stress to said test probe;

d. a jacket including an inlet and an outlet, said jacket surrounding a portion of said test probe and a portion of said evacuatable chamber such that a fluid circulated through said jacket contacts the test probe;

e. ion pump in fluid communication with said evacuatable chamber; and

f. means for indicating the current in the ion pump as an



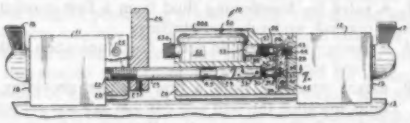
indication of the amount of hydrogen permeating through the test probe into the evacuatable chamber thereof.

4,020,681

PORTABLE STRAIN GAUGE

John W. O'Brien, 607 S. Kelly St., Harrison, Ark. 72601

Filed Aug. 25, 1975, Ser. No. 607,480
Int. Cl.² G01B 5/30
U.S. Cl. 73—88 R 9 Claims



1. A strain gauge for a stressed, magnetic bar member, said gauge comprising:

first and second bases;

quick release attachment means including magnets associated with the respective first and second bases for mounting said bases on the bar member by magnetic attraction thereto, said attachment means further including uniformly flat engagement surfaces for contacting said bar member;

an actuator member having opposite ends, one of said ends being secured to said first base and the other of said ends being freely received by said second base for sliding axial movement relative to the second base upon deformation of the bar member; and

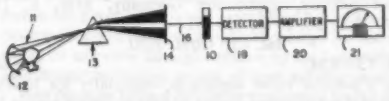
indicator means cooperating with said actuator member to provide an output indication proportional to the amount of axial movement of said actuator member relative to said second base.

4,020,682

METHOD OF MEASURING MECHANICAL DAMAGE TO GRAIN

Mofazzal Hossain Chowdhury, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed June 16, 1976, Ser. No. 696,736
Int. Cl.² G01N 33/02
U.S. Cl. 73—104 13 Claims



1. A method of measuring mechanical damage to grain comprising: applying to a sample of said grain a substance which will selectively adhere to the exposed surface of the

interior of the damaged grain and not to the seed coat; applying a recovery solution to said sample which will remove said substance adhering to the exposed internal portions of the grain; and measuring the amount of said substance removed from said grain by said recovery solution, said measurement being quantitatively representative of the damage of said grain.

4,020,683

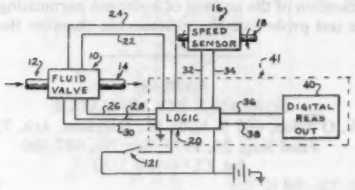
FLUID MEASURING VALVE AND SYSTEM TO MEASURE MILES PER GALLON OF A VEHICLE

Michael R. Young, 5808 Ramblewood, Brighton, Mich. 48116

Filed June 21, 1976, Ser. No. 698,099

Int. Cl.² G01F 9/00

U.S. Cl. 73—114 **8 Claims**



1. A valve for transferring fluid from a first conduit to a second conduit, said valve comprising;

A. a passage in open fluid series communication with said first and second conduits;

B. means operative from a first position providing fluid communication through said passage to a second position blocking fluid communication through said passage;

C. means for biasing said operative means to one of said positions;

D. means responsive to a signal to move said operative means to said other position;

E. a first variable volume reservoir for storing a quantity of fluid and having a predetermined maximum volume, said first reservoir being in open fluid communication with said passage on the upstream side of said operable means,

F. a second variable volume reservoir for storing a quantity of fluid and having a predetermined maximum volume, said second reservoir being in open fluid communication with said passage on the downstream side of said operable means;

G. means to expand the volume of one of said reservoirs and simultaneously contract the volume of the other reservoir by equal amounts when said operative means is in one of said positions and to expand said volume of said other reservoir and contracts said volume of said one reservoir by equal amounts when said operative means is in said other position; and

H. means to provide a signal to said responsive means when one of said reservoirs expand to said predetermined maximum volume.

4,020,684

CONTROL VALVE ESPECIALLY FOR HYDRAULIC ABSORPTION DYNAMOMETERS

Hans-Walter Dodt, Darmstadt, Germany, assignor to Carl Schenck AG, Darmstadt, Germany

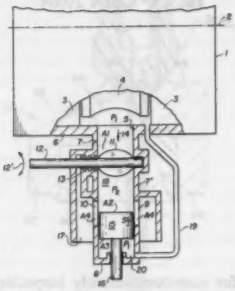
Filed June 21, 1976, Ser. No. 697,775

Claims priority, application Germany, Mar. 1, 1976, 2608374; July 26, 1975, 2533514

Int. Cl.² G01L 3/20

U.S. Cl. 73—134 **15 Claims**

1. In a control valve apparatus, especially for hydraulic absorption dynamometer means having exit port means leading into closed end discharge conduit means for the liquid, the improvement comprising lateral discharge opening means in said discharge conduit means, a displacement member movable in said discharge conduit means for varying the area of said lateral discharge opening means, said displacement member having a first surface facing toward said exit port means and a second surface facing away from said exit port means



toward said closed end of said discharge conduit means, and pressure supply means operatively connecting said dynamometer means to said closed end of said discharge conduit means, whereby said second surface of said displacement member is exposed to a predetermined pressure.

4,020,685

PHASEMETERS

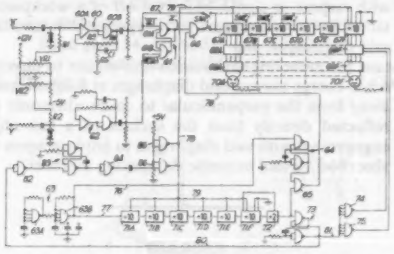
Reuel Duncan Van Millingen, Ravensthorpe, and Robert Terence Portus, Ashby-de-la-Zouch, both of England, assignors to Torquemeters Limited, Ravensthorpe, England

Filed May 27, 1975, Ser. No. 580,739

Claims priority, application United Kingdom, May 29, 1974, 23743/74

Int. Cl.² G01L 3/10

U.S. Cl. 73—136 A **20 Claims**



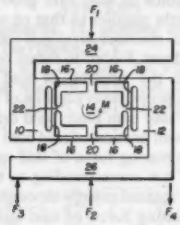
1. A phasemeter for determining the relative angular displacement of two harmonic signal waves derived from transducers, comprising: two trigger devices each for receiving a respective said signal wave and which produce an output pulse each time the respective signal wave passes through a reference level in at least one sense of direction; trigger adjustment means for setting the level at which each said device triggers; a bistable which in operation has first and second stable output states and which receives the output of each said trigger device in such manner that it produces a square wave output the Mark-Space ratio of which is directly related to the relative angular displacement of said two harmonic signal waves; measuring apparatus which receives said bistable square wave output, measures the Mark-Space ratio thereof and produces an output indicative of said relative angular displacement; in which further means are provided for determining each said trigger device set-point comprising, attenuator means for selectively and respectively attenuating said signal waves, and switch means for reversing the inputs to said trigger devices.

4,020,686

FORCE MEASURING APPARATUS

Albert E. Brendel, Lake Orion, Mich., assignor to Lebow Associates, Inc., Troy, Mich.

Filed Jan. 5, 1976, Ser. No. 645,059
Int. Cl.² G01L 5/00
U.S. Cl. 73—141 A 13 Claims



6. A flexural member for use in a force measuring system capable of measuring forces along a first predetermined axis and also moments about a second predetermined axis perpendicular to the first axis comprising:

first and second structures spaced from each other in the direction mutually perpendicular to said first and second axes, said first structure adapted to deflect in the direction parallel to said first axis in response to an applied force or moment to be measured, and said second structure being connected to a non-yieldable reaction member;

a first pair of spaced flexure members each connected at its opposite ends to said first and second structures, said first pair of flexure elements being substantially rigid in a direction parallel to said mutually perpendicular direction but being readily resiliently yieldable in a direction parallel to said first axis, thereby to establish in coaction with said first and second structures a four-sided structure which responds to applied forces or moments to be measured as a parallelogram with pivot connections between the sides;

a force carrying structure interconnecting said first and second structures through a second pair of spaced flexure elements, one of said flexure elements of said second pair interconnecting said first structure with said force carrying structure and capable of permitting relative rotation therebetween about an axis parallel to said second predetermined axis, and the other flexure element of said second pair interconnecting said second structure with said force carrying structure and capable of permitting relative rotation therebetween about an axis parallel to said second predetermined axis;

the flexure elements of at least one of said pairs of flexure elements being so constructed and arranged that the effective distance between said pair can be readily modified by removal of material, thereby changing the sensitivity of the flexural member;

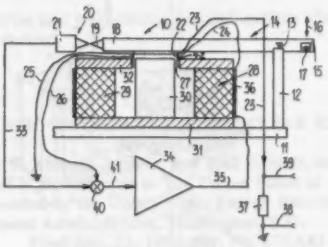
resiliently yieldable means interconnecting said force carrying structure to each of the flexure elements of said first pair of flexure elements and adapted to deflect in proportional response to the rotation of said force carrying structure relative to said first and second structures, whereby the deflection of said yieldable means is proportional to the magnitude of either a force to be measured which is applied to said first structure or a moment to be measured which is applied to said force carrying structure, whichever the case may be.

4,020,687

ELECTRODYNAMIC FORCE MEASURING APPARATUS

Peter Fischer, Dolderstrasse 40, 8032 Zurich, Switzerland

Filed June 20, 1975, Ser. No. 589,487
Claims priority, application Switzerland, June 26, 1974, 8747/74
Int. Cl.² G01L 1/08
U.S. Cl. 73—141 R 2 Claims



1. An electrodynamic force measuring apparatus comprising a force coil arranged in a stationary magnetic field and movable out of a null position by the action of the force which is to be measured, a stationary substantially ring-shaped permanent magnet possessing a substantially ring-shaped gap in which there is axially displaceably arranged said force coil, the return path of the magnetic flux being coaxial to and within said ring-shaped permanent magnet, a feeler for detecting deviations of the force coil out of the null position, said feeler including a movable component, means for pivotably suspending the movable component for free pivotable movement, an amplifier for supplying the force coil with a current, said force coil as a function of its deviation out of the null position detected by the feeler being supplied via the amplifier with said current which under the action of the stationary magnetic field produces a restoring force which forces the force coil back into the null position, said force coil being connected in series with a compensation coil changing the field intensity of the stationary magnetic field, said compensation coil being wound coaxially with respect to the force coil, said compensation coil being dimensioned such as to vary a resultant magnetic filed composed of the stationary magnetic field and a magnetic field generated by the flow of current in said force coil in such a manner that the restoring force acting upon the force coil remains substantially proportional to the current, a velocity coil member movable together with the force coil in the same magnetic field as the force coil, said amplifier having an input, said velocity coil member being connected in circuit with the input of said amplifier.

4,020,688

ULTRASONIC INSPECTION APPARATUS FOR VERTICAL MEMBERS

H. Morris Hauldren, Culloden, W. Va., assignor to W. C. Lamb, Lafayette, La.

Filed Oct. 8, 1975, Ser. No. 620,748
Int. Cl.² G01N 29/04
U.S. Cl. 73—151 26 Claims

1. Apparatus for ultrasonic inspection of a substantially vertically disposed tubular member which comprises:

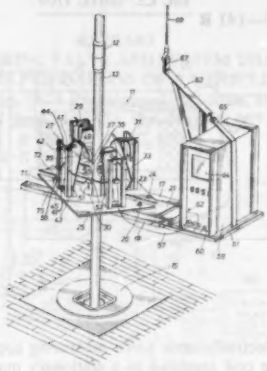
a frame having a horizontally extending baseplate with an opening therein defining a vertical passage for the tubular member to move through relative to the baseplate,

said frame providing access of said tubular member to said passage from a direction transverse to the longitudinal axis of said tubular member;

a plurality of ultrasonic search units mounted on said frame in spaced relation relative to the circumference of said member, each of said ultrasonic search units comprising a

wheel disposed in rolling contact with said tubular member,

each of said wheels including an electroacoustic transducer sonically coupled to said tubular member; and



means urging said wheels against the tubular member disposed in said passage.

4,020,689

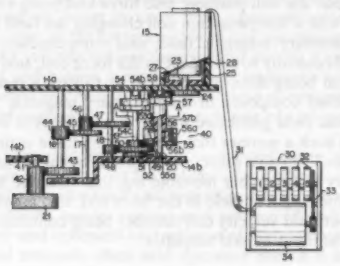
FLOW METER

Hajime Onoda, Tokyo, and Hiroshi Watanabe, Urawa, both of Japan, assignors to Kimmon Manufacturing Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1976, Ser. No. 712,543

Int. Cl.² G01F 1/00; H02K 7/10

U.S. Cl. 73—272 R **4 Claims**



1. A flow meter comprising a flow-rate detecting means for dynamically converting the flow rate of a fluid to be measured into a continuous rotation, thereby continuously rotating an output member; an intermittent-movement conversion means including a reduction gear mechanism and arranged close to said detecting means so as to rotate an output member of the conversion means rapidly and intermittently each time the rotation of an input member of the conversion means continuously rotating in response to the rotation of the output member of said detecting means attains a prescribed degree; a pulse generator including a rotor rapidly rotatively driven by the output member of said conversion means and a generation coil generating driving pulses in response to the intermittent rotation of the output member of said conversion means and arranged close to said conversion means; and an indicating device for digitally indicating the consumption of a fluid, having a counting means including a series of indicating wheels and an electrical-mechanical conversion means for operating said counting means by means of driving pulses from said pulse generator and arranged at a remote place from said pulse generator; said intermittent-movement conversion means comprising a driving disc capable of continuously rotating at a speed reduced by means of said reduction gear mechanism in accordance with the rotation of the input member, a cam plate capable of rotating relatively to and coaxially with said driving disc through a prescribed angular range, said cam plate having a dwell portion and a plurality of cam grooves formed on the outer periphery thereof, said dwell portion having the same radius as said cam grooves, a spring drum rotating about an axle parallel to that of said driving disc, an intermittently-driven member arranged rotatably on the same axle as that of said drum, forced to rotate only in one direction in accordance with the rotation of said spring drum, and having a plurality of projections capable of being engaged with the cam grooves of said cam plate; said driven member being restrained by the dwell portion of said cam plate from rotating in opposition to the biasing force of said spring drum with the projections thereof not corresponding to the cam grooves of said cam plate, and rotated rapidly through a prescribed angular range by the biasing force of said spring drum with the projections thereof corresponding to the cam grooves in accordance with the rotation of the cam plate, thereby providing an intermittent rotary drive of the output member of said intermittent-movement conversion means; said electrical-mechanical conversion means including a pulse motor.

4,020,690

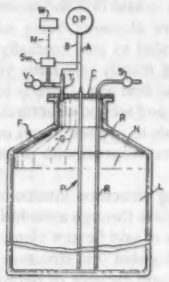
CRYOGENIC LIQUID LEVEL MEASURING APPARATUS AND PROBE THEREFOR

W. Edward Samuels, 402 W. Blackbeard Road, Wilmington, N.C. 28401, and Robert J. Adler, 3068 Van Aken, Shaker Heights, Ohio 44120

Filed Sept. 22, 1975, Ser. No. 615,394

Int. Cl.² G01L 7/00

U.S. Cl. 73—299 **30 Claims**



20. A probe apparatus for use in carrying out the measuring of static liquid pressure comprising:

a tubular structure providing a probe sensor tube affording a tube bore thermally insulated from the body of the liquid except at the next-mentioned input opening and having opposite end regions provided respectively with an input opening to and an output opening from the tube bore,

said structure enabling the input opening to be located at said point and enabling a connection of the output opening to an input of a fluid pressure responsive device;

means providing a heat path, thermally insulated from the body of the liquid, to the sensor tube bore up to the input opening, for a heat input rate sufficient to evaporate in the bore, and to maintain said bore clear of, said liquid; and

means on the probe affording a connection point for connecting the output opening of the bore to a said fluid pressure responsive device;

thermal insulation for said sensor tube bore being provided by an outer jacket tube coaxially disposed about, and at

its ends joined to, said sensor tube to enclose a lower pressure or vacuum space under conditions of use of the probe;

said sensor tube being comprised of material of high thermal conductivity thereby to provide said heat path.

4,020,691

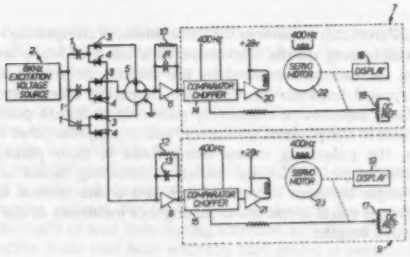
D.C. SIGNAL CURRENTS IN CAPACITANCE GAGING SYSTEMS

Cecil Franklin, Shelburne, Vt., assignor to Simmonds Precision Products, Inc., Tarrytown, N.Y.

Division of Ser. No. 432,242, Jan. 10, 1974, abandoned. This application May 10, 1976, Ser. No. 684,834

Int. Cl.² G01F *23/26*

U.S. Cl. 73—304 C **6 Claims**



1. An aircraft fuel contents measuring and display system, comprising

a plurality of variable impedance type transducers each sensitive to the fuel content of a respective one of several aircraft fuel tanks,

an A.C. energisation source for energising the transducers in parallel to produce A.C. signals dependent on the impedance of each transducer,

a respective pair of rectifier means connected to each transducer and defining respective first and second circuit paths for that trandsucer which respectively carry unidirectional currents of opposite polarity both dependent on the A.C. signals of that transducer,

first and second integrating means,

selector means having inputs respectively connected to all the said first circuit paths and a single output for feeding any selected one of its inputs to the first integrating means to produce an output signal dependent on the fuel content sensed by the transducer feeding the selected one of the first circuit paths, and

means additively connecting all the second circuit paths to the second integrating means to produce a second output signal dependent on the sum of the fuel contents sensed by all the said transducers.

4,020,692

ULTRASONIC THERMOMETER ISOLATION STANDOFFS

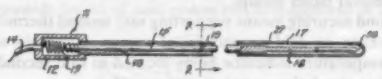
Alvin E. Arave, Idaho Falls, Idaho, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 26, 1975, Ser. No. 617,125

Int. Cl.² G01K *11/24*

U.S. Cl. 73—339 A **6 Claims**

1. In a high-temperature ultrasonic thermometer which includes an ultrasonic transmission line surrounded by a protective sheath, the improvement therein to minimize sticking of said transmission line to said sheath and prevent noise echoes from interfering with signal echoes comprising: small isolation standoffs mounted on said transmission line to minimize points of contact between said transmission line and said sheath, said isolation standoffs being sections of thin wire



mounted on said transmission line at locations where a signal echo is desired.

4,020,693

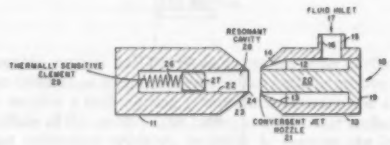
ACOUSTIC TRANSDUCER FOR NUCLEAR REACTOR MONITORING

Frederic F. Ahlgren, Alplaus, and Paul F. Scott, Schenectady, both of N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 12, 1976, Ser. No. 675,843

Int. Cl.² G01K *11/26, 13/02;* **G21C** *17/02*

U.S. Cl. 73—339 A **8 Claims**



1. An acoustic transducer for use with a remote receiver for monitoring a selected parameter composed of the temperature of a fluid flowing therethrough comprising: means defining an annular nozzle for producing a jet of fluid passing therethrough, means for supplying fluid to said nozzle, means defining a resonant cavity positioned in alignment with said annular nozzle, and means responsive to the selected parameter for varying geometry of said resonant cavity, whereby fluid passing through said nozzle impinges on said resonant cavity forming means creating an acoustic signal having a frequency responsive to the selected parameter being monitored.

4,020,694

APPARATUS FOR DISPLAYING AND MANIPULATING AN INDOOR/OUTDOOR THERMOMETER

Theron T. Mayhew, Emporia, Kans., assignor to Hopkins Manufacturing Corporation, Emporia, Kans.

Filed Nov. 26, 1975, Ser. No. 635,690

Int. Cl.² B65D *73/02*

U.S. Cl. 73—343 R **6 Claims**

1. An apparatus for displaying and manipulating two thermometers, said apparatus comprising:

first panel means operable to support and display one thermometer;

a first thermometer means including

a temperature scale, and

a first temperature indicator operable to cooperate with said temperature scale to indicate temperature readings;

first, window simulating, opening means carried by said first panel means;

first securing means supporting said first thermometer means on said first panel means, with said temperature scale being located in said first, window simulating opening means;

second panel means operable to support and display another thermometer;

second thermometer means including

a second temperature indicator operable to cooperate

with said temperature scale to indicate temperature readings;

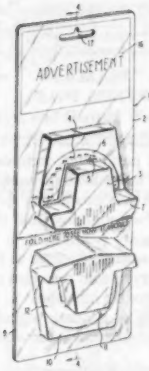
second, window simulating, opening means carried by said second panel means;

second securing means supporting said second thermometer means on said second panel means, with said second temperature indicator being located in said second, window simulating opening means; and

hinge means hingedly connecting said first panel means and said second panel means, with said second thermometer means supported on said second panel means being mounted in inverted relation relative to said first thermometer means while said first panel means and second panel means are disposed in a generally unfolded relationship;

said second panel means being operable to fold about said hinge means and position said second temperature indicator in temperature reading cooperation with said temperature scale of said first thermometer means;

said first securing means being independent of said second panel means;



said second securing means being independent of said first panel means;

said first securing means and said second securing means being relatively moveable and operable to permit said folding of said second panel means about said hinge means; and

said first panel means, with said first thermometer means secured thereto by said first securing means, and said second panel means, with said second thermometer means secured thereto, being relatively moveable between

said unfolded relationship, wherein said first thermometer means and said second thermometer means are disposed in a spaced, mutually inverted relation and displayed on one side of generally planor panel means defined by said first and second panel means, and

a folded relationship, wherein said first panel means and second panel means are mutually overlapping and said first thermometer means and second thermometer means are displayed on opposite sides of said overlapping first and second panel means.

4,020,695

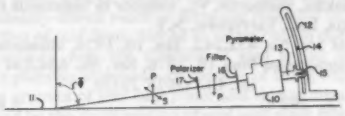
METHOD AND APPARATUS FOR MEASUREMENT OF SURFACE TEMPERATURE

John E. Roney, Monroeville, Pa., assignor to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 614,696, Sept. 18, 1975, abandoned. This application Jan. 7, 1976, Ser. No. 647,190

Int. Cl.[2] G01J *5/06;* **G01N** *21/40*

U.S. Cl. 73—355 EM **2 Claims**



1. Pyrometer apparatus for metal surfaces comprising radiation detecting means responsive to a band of wave lengths from the radiation emitted by the surface, polarizing means interposed between the radiation detecting means and the surface, adjusted to selectively pass only radiation polarized parallel to the plane of emittance, and to suppress other radiation, the polarizing means being fixed in their place, and means for positioning the radiation detecting means so that the angle between its optical axis and a line normal to the surface is equal to the principal angle of incidence of the band of wave lengths.

4,020,696

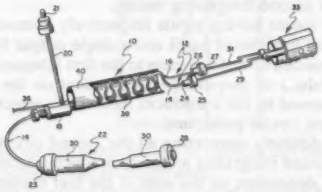
HIGH PRESSURE, HIGH TEMPERATURE TRANSDUCER

John J. Vrolyk, Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 23, 1976, Ser. No. 660,540

Int. Cl.[2] G01L *7/04;* **G01N** *17/00*

U.S. Cl. 73—412 **9 Claims**



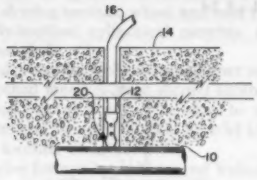
1. A high pressure, high temperature transducer device of the type associated with fatigue testing of materials where said materials are subjected to vibratory strain oscillations, heated in a furnace and pressurized, said transducer comprising;

a pair of substantially identical parallel tubes, the tubes being tortiously deformed in a manner to assure that each tube will lengthen linearly when subjected to an internal pressure, each of said tubes are sealed at one end, the first active tube of said pair of tubes is connected internally to the interior of a specimen to be fatigue tested at the end opposite the sealed end while the second reference tube of said pair of tubes is connected to a reference pressure source at the end opposite the sealed end of said second tube, the sealed ends of said first and second tubes are connected to a means to measure relative displacement between said first and second tube when said specimen is vibrated, heated and pressurized to failure.

4,020,697
GAS SAMPLING PROBE

Berthold R. Jander, 3000 W. Irving Blvd., Apt. 110, Irving, Tex. 75061

Filed Nov. 10, 1975, Ser. No. 630,289
Int. Cl.² G01N 1/22
U.S. Cl. 73—421.5 R 2 Claims



1. A gas probe for attachement to a conduit for inserting in a pre-existing hole to obtain gas samples from the vicinity of a buried gas system comprising:

an elongate body of a size to fit in said hole;

means on one end of said body for attaching said body to the conduit to communicate with said probe when said probe is inserted in said hole;

two enlarged portions on said body positioned on either side of a reduced diameter portion, said enlarged portions having arcuate peripheral surface thereon for engaging the walls of said hole during insertion and removal of the probe from said hole whereby said probe is centered in said hole and said enlarged portions act as guides to reduce lodging of soil in the sampling bores in the body;

a chamber in said body for communication with the conduit;

said reduced diameter portion having sampling bores formed therein communicating with said chamber; and

a sampling bore formed in said body on the end opposite said one end and communicating with said chamber.

4,020,698
PIPETTE WHICH MAY BE CALIBRATED

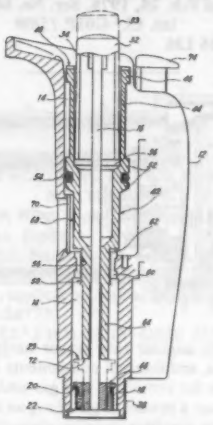
Eric Marteau D'Autry, 69-72 rue Gambetta, Villiers-le-Bel 95 Arnouville-les-Gonesse, France

Filed Oct. 28, 1975, Ser. No. 625,893
Claims priority, application France, Oct. 29, 1974, 74.36136
Int. Cl.² B01L 3/02
U.S. Cl. 73—425.6 11 Claims

1. Pipette having a fixed volume which can be calibrated, of the type comprising:

a casing of oblong shape defining internally and essentially cylindrical cavity intended to receive, at its center, the rod of a piston-rod arrangement urged permanently upwards in a resilient manner, said rod being capped at its upper end by a push-button member able to be actuated from outside said casing and

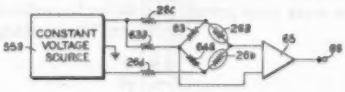
an outer tube, fixed to said casing coaxially with respect to said cavity, inside which the lower part of the piston-rod arrangement of straight circular section is able, due to actuation of the push-button member, to slide in a sealed manner and along a certain predetermined path limited in both directions, in order to define a variable volume chamber intended to cause filling or discharge of the sample to be taken, characterised by the fact that it comprises, inside said cavity in the casing, a calibration member arranged coaxially to the latter and whereof at least the upper part is in the shape of a sleeve, to which is imparted a rotary movement about its axis; by the fact that the calibration member comprises, on at least part of its outer surface, a screwthread intended to co-operate with a corresponding screwthread provided on the inner surface of said cavity; by the fact that said pipette also comprises a tubular abutment member coaxial with respect to the calibration member and adjacent the lower end of the latter, said abutment member being intended to co-operate with a locking bush integral with said rod of the piston-rod arrangement, in order to limit the useful upwards travel of said piston-rod arrangement in an adjustable manner and by the fact that the outer surface of the calibration member comprises an annular groove able to receive a braking ring compressed between the inner surface of the cavity in the casing and the outer surface of said calibration member in order to prevent the latter from rotating.



4,020,699
TEMPERATURE STABILIZED FLUIDIC ANGULAR RATE SENSOR

Max A. Schaffer, Fairfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 5, 1976, Ser. No. 655,345
Int. Cl.² G01P 15/08
U.S. Cl. 73—497 2 Claims



1. A fluidic angular rate sensor, comprising:

means including a nozzle for providing a fluid jet;

sensing means, disposed in the path of the fluid jet, including a pair of series-connected sensing elements, each having a given resistance at a nominal temperature and a significant temperature coefficient of resistivity;

a pair of series-connected reference resistors arranged in a bridge configuration by connections to said sensing elements, each having a resistance larger than that of said sensing elements and substantially equal to the other;

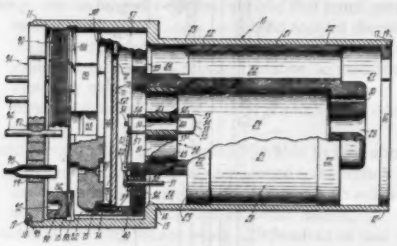
a constant voltage power supply having a pair of outputs; and

a pair of dropping resistors, each having a resistance on the same order of magnitude as said given resistance, each connecting one of said power supply outputs to a respective one of said connections.

4,020,700
UNITARY FLUIDIC ANGULAR RATE SENSOR

Mario T. Lopiccolo, Southington; Max A. Schaffer, Fairfield, and George A. Jachyra, New Haven, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 25, 1976, Ser. No. 661,904
Int. Cl.² G01P 15/08
U.S. Cl. 73—516 LM 10 Claims



1. In a fluidic angular rate sensor having a sealed casing filled with a gas, and internal components including a nozzle, pumping means for providing said gas under pressure to said nozzle to produce a stream of gas along an axis within a chamber, temperature sensitive resistive elements disposed in said chamber in the path of said stream for differential cooling by said stream as a function of said sensor experiencing an angular rotation in a plane of sensitivity, the improvement comprising:

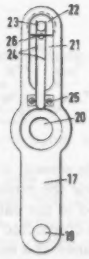
internal threads in said casing near a first end thereof; and

a threaded locking means comprising a lock nut engaging the internal threads of said casing and a conical spring interposed between said lock nut and one of said internal components for applying pressure against said internal components to secure them in said casing.

4,020,701
GYROSCOPIC APPARATUS

Kenneth Robson Brown, Midlothian; James Holmes, and Richard David Whyman, both of Edinburgh, all of Scotland, assignors to Ferranti, Limited, Hollinwood, England

Filed July 8, 1975, Ser. No. 594,117
Claims priority, application United Kingdom, July 16, 1974, 31372/74
Int. Cl.² G01C 19/20
U.S. Cl. 74—5 R 10 Claims

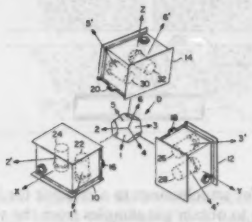


1. A floated gyroscope comprising a sealed float, a gyroscope motor and wheel located within said float, a housing in which said float is pivoted for limited rotational movement about an axis, a viscous fluid contained within said housing and surrounding said float, a locating member mounted on one of said housing and said float, and limit means carried by the other of said housing and said float and operable to restrict the angular movement of said locating member when the gyroscope is not in use to a value less than its normal operating value.

4,020,702
REDUNDANT INERTIAL MEASUREMENT SYSTEM CONFIGURATION

Michael Epstein, New Milford, N.J., assignor to The Bendix Corporation, Teterboro, N.J.

Filed June 17, 1974, Ser. No. 480,182
Int. Cl.² G01C 19/02
U.S. Cl. 74—5.34 4 Claims



1. A redundant inertial measuring system for a space vehicle comprising:

three strapdown platforms supported by the vehicle;

each platform supporting two inertial sensors;

the sensors being oriented by disposing the sensitive axes thereof substantially normal to the faces of a regular dodecahedron;

power supply means, rebalancing means and scaling means associated with each of the sensors;

each of the power supply means exergizing its associated sensor, rebalancing means and scaling means;

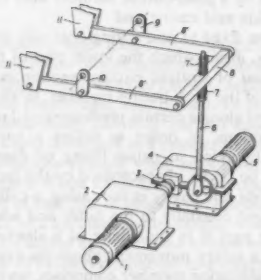
each of the scaling means connected to its associated sensor for scaling the output therefrom; and

each of the rebalancing means connected to its associated scaling means and sensor and responsive to the scaled output for closing a loop around the sensor and for providing an output independent of the other of the rebalancing means.

4,020,703
SWING DRIVE, IN PARTICULAR A RECIPROCATING DRIVE FOR MOULDS IN CONTINUOUS CASTING PLANTS

Franz Bartel, Vosendorf, and Karl Dub, Vienna, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed May 15, 1975, Ser. No. 577,622
Claims priority, application Austria, June 12, 1974, 4850/74
Int. Cl.² G05G 1/00
U.S. Cl. 74—600 2 Claims



1. A reciprocation gear for driving a mould of a continuous casting plant with a swinging motion, said driven mould being mounted at one end of a balance beam and one end of a

connecting rod being hinged at the other end of the balance beam, the other end of the connecting rod being connected to said gear, said reciprocation gear comprising:

a driving toothed wheel;

a shaft eccentrically mounted in the driving toothed wheel and having an overhung crank at one end, the connecting rod being attached to the crank by means of a crank pin, the crank radius being equal to the distance between the axes of said driving toothed wheel and said crank shaft;

a first helically-toothed cylindrical member rigidly connected to said shaft;

a second helically-toothed cylindrical member meshing with said first toothed member, said second toothed member being secured against rotation relative to said driving toothed wheel and being adjustable parallel to the axis of said driving toothed wheel; and

an actuating drive for moving said second helically-toothed member in its axial direction so as to adjust the crank pin between a position in which it is coaxial with said driving toothed wheel, thereby producing a zero effective crank radius, and a position in which the crank pin axis is displaced from the toothed wheel axis, thereby producing a predetermined effective crank radius.

4,020,704

PUSHBUTTON TUNER

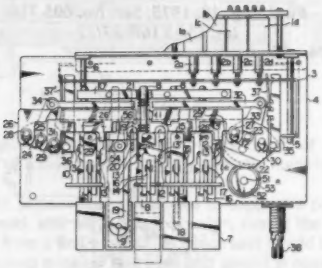
Kiyosi Miyagi, Yokohama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed June 6, 1975, Ser. No. 584,357

Claims priority, application Japan, June 10, 1974, 49-66409

Int. Cl.² F16H *35/18*

U.S. Cl. 74—10.33 **5 Claims**



1. A pushbutton tuner comprising at least one tuning element, first and second members rotatable about axes, respectively, first and second link members each extending between said first and second rotatable members and having opposite ends pivotally connected thereto, an auxiliary link member interconnecting said first and second rotatable members to form a link work together with said first and second link members and rotatable members, said auxiliary link member being pivotally connected to each of said first and second rotatable members at a point positioned at the apex of a triangle having its bottom side formed by a line joining the points at which said first and second link members are pivotally connected to each rotatable member, at least one pushbutton, a stem carrying said pushbutton, a regulating member carried by said stem and having portions adapted to be urged against said first and second link members when said pushbutton is pushed thereby to move said first and second link members and correspondingly rotate said first and second rotatable members, at least one variable element operatively connected to said link work and movable relative to said tuning element when said pushbutton is pushed whereby a tuned state is obtained, pins secured to said first and second rotatable members to pivotally connect said first and second rotatable members to said first and second link members, each of said pins having a groove formed therein, said first and second link members being formed therein with through-holes each formed by a circular portion and non-circular portion, each of said pins extending through each of said through-holes, and a resilient retainer having an end portion engaged with the groove in each of said pins and urging the non-circular portion of the associated through-hole against the pin.

4,020,705

COARSE-FINE FOCUSING DEVICE FOR PRECISION MACHINERY

Toshimi Hayasaka, Hino, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

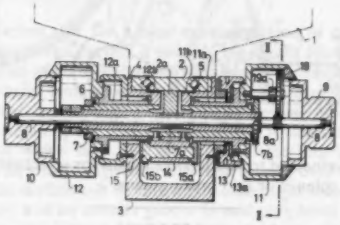
Continuation of Ser. No. 394,474, Sept. 5, 1973, abandoned.

This application May 8, 1975, Ser. No. 575,702

Claims priority, application Japan, Sept. 6, 1972, 47-89312; Mar. 3, 1973, 48-24773

Int. Cl.² F16H *35/18*; G02B *21/26*

U.S. Cl. 74—10.54 **2 Claims**



1. A coarse-fine focusing device for a microscope comprising a sleeve fixed to the body of a microscope, a pinion shaft with a pinion rotatably fitted in said sleeve, a fine adjustment shaft rotatably fitted in said pinion shaft, right and left fine adjustment handles fixed at both ends of said fine adjustment shaft, right and left coarse adjustment handles provided coaxially with said fine adjustment handles and rotatably fitted to said sleeve, a gear fixed to said fine adjustment shaft, another gear provided to said pinion shaft, a reduction gear mechanism mounted to said coarse adjustment handle and connecting said two gears, a short bush arranged in parallel with said sleeve and fixed to said body, a gear shaft mounted to said bush and having gears at both ends thereof, and other two gear shafts respectively mounted to said right and left coarse adjustment handles and respectively having other gears meshing with said gears on said gear shaft.

4,020,706

TIRE SPINNER WITH DUAL 4 BAR MECHANISM FOR SPIN AND BRAKE

John A. Gloviak, 750 W. Hutchinson, Chicago, Ill. 60613, and Robert D. Rice, 5035 Lawn Ave., Western Springs, Ill. 60558

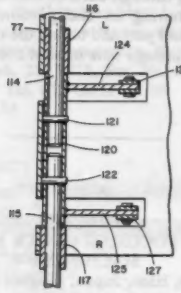
Filed Apr. 11, 1975, Ser. No. 567,187

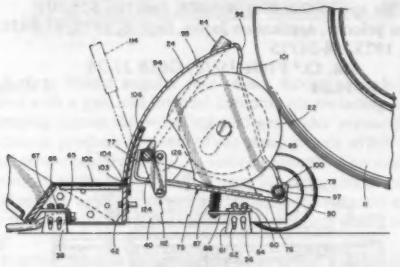
Int. Cl.² F16H *37/00*

U.S. Cl. 74—16 **11 Claims**

1. A tire spinner comprising; frame means, motor means mounted for movement on said frame means, a wheel spinner carried by said motor means, brake means mounted for move-

ment on said frame means, common linkage means interconnecting said brake means and said motor means and handle





means connected to said linkage means for selectively operating said spinner or said brake means.

4,020,707

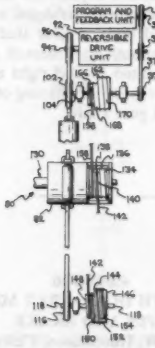
MOTION TRANSLATING APPARATUS AND CONTROLS THEREFOR

Mario Cuniberti, Columbus, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 418,553, Nov. 23, 1973, Pat. No. 3,896,926, which is a division of Ser. No. 295,530, Oct. 6, 1972, Pat. No. 3,841,497. This application Jan. 17, 1975, Ser. No. 541,761

Int. Cl.² F16H *19/06*

U.S. Cl. 74—37 **22 Claims**



1. Apparatus for cntrolling relative motion of a plurality of components comprising:

a. an element to be selectively rotated, said element comprising rotatable drum means;

b. carrier means for journally supporting said element;

c. means for moving said carrier means to cause said element to travel along a predetermined path, said path having a first portion along which said element is to be rotated and a second portion along which said element is to be rotated;

d. means for rotating said element, said means for rotating including wheel means, and still further including flexible means for connecting said rotatable drum means to said wheel means;

e. means for sensing the position of said element on said path and providing a signal when said element is one of said portions by sensing the position of said carrier means;

f. means responsive to said sensing means signal for connecting said element rotating means to rotate said element when said element is travelling along said second portion of said path by connecting said wheel means to said element;

g. means for maintaining said flexible connection means between said wheel means and said rotatable drum means at a length which will not cause rotation of said rotatable drum means when said drum means is moving along said first portion of said path; and

h. means for changing the length of said flexible connecting means between said wheel means and said rotatable drum means when said drum means is moving along said second portion of said path to impart rotation to said drum means.

4,020,708

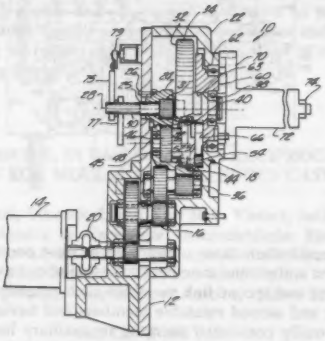
EPICYCLOIDAL CRANK DRIVE MECHANISM

Bart R. Obra, St. Clair Shores, Mich., assignor to Easom Engineering & Manufacturing Corporation, St. Clair Shores, Mich.

Filed Aug. 18, 1975, Ser. No. 605,716

Int. Cl.² F16H *37/12*

U.S. Cl. 74—52 **9 Claims**



1. A motion generating mechanism comprising:

a support frame;

a first rotary member carried by said support frame for rotation about a fixed first axis;

first driving means for driving said first rotary member;

a second rotary member carried by said first rotary member and rotatable therewith about said first axis as said second rotating member rotates about a second movable axis that is parallel to said first axis;

rotation inducing means carried by said support frame and engaging said second rotary member for rotating said second rotary member about said second axis;

a third rotary member carried by said support frame for rotation about said first axis;

a crank arm extending from said third rotary member for motion through a non-linear path; and

a coupling member carried by said second rotary member and spaced from said second axis, said coupling member movably engaging said third rotary member to rotate said

third rotary member about said first axis as said second rotary member rotates, said third rotary member having a radial slot disposed on the side thereof adjacent to said coupling member, said coupling member engaging said third rotary member by means of said slot for imparting motion thereto, said coupling member being disposed along an axis which is spaced from said second axis whereby the motion of said crank arm varies in a prescribed manner relative to the acceleration and velocity of said first driving means.

4,020,709

DEVICE FOR ADJUSTING THE OPENING TRAVEL OF THE MOVABLE PLATE OF A MOLDING MACHINE FOR PLASTIC MATERIALS

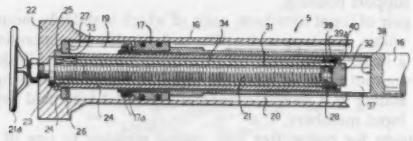
Mario Brocchi, Lugano, Switzerland, assignor to F. Lli Sandretto S.a.s., Turin, Italy

Filed July 16, 1974, Ser. No. 489,006

Claims priority, application Switzerland, Aug. 10, 1973, 11596/73

Int. Cl.² F16H *27/02*

U.S. Cl. 74—89.15 **3 Claims**



1. A device for adjusting the opening travel of a mould holder unit of a machine for moulding plastic materials, comprising:

a movable plate which is arranged to support a portion of the mould, said plate being movable, during the opening travel, from a first position, in which said mould is closed, to a second position in which said mould is opened;

a cylinder comprising a piston movable in a casing and apt to actuate said movable plate;

a stop member mounted in said casing to act as a stop for said piston during said opening travel, the position of the stop member being variable by displacing the stop member axially with respect to the casing;

a threaded stem mounted to rotate within the casing and fixed against axial movement with respect to said casing;

a screw nut connected to said stop member and in threaded engagement with the stem;

means arranged to prevent said screw nut from rotating with respect to said casing, so that in consequence of the rotation of said threaded stem only axial translation of said screw nut, and said stop member connected thereto, takes place;

supporting and sealing means for said stop member, said supporting and sealing means including a tubular element which is provided with seats for supporting said stop member and with sealing elements for preventing said fluid from penetrating between said movable member and said tubular element; and

said casing of the cylinder including an end wall, and said threaded stem and said tubular element are provided with an annular end protuberance, the casing having formed therein a cavity in which the annular protuberance of said threaded stem is rotatable and a cavity in which the annular protuberance of said tubular element is fixed.

4,020,710

FRICTION DISC FOR FALSE TWISTING DEVICES

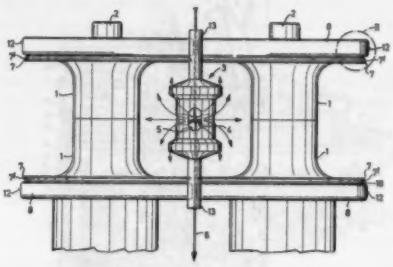
Hans Gassner, and Otto Lang, both of Schweinfurt, Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed June 12, 1975, Ser. No. 586,378

Claims priority, application Germany, June 12, 1974, 2428514

Int. Cl.² D01H *7/92*; B21B *27/00*

U.S. Cl. 74—206 **7 Claims**



1. A friction disc for a false twisting device or crimping thread, said device having a twisting tube, said friction disc having a pair of faces and a peripheral surface therebetween, said peripheral surface when the disc is associated with the tube on the false twisting device being in the path of oil flung from the thread by the tube as the thread is twisted, that face of the disc which faces the said tube intersecting the said surface in an abrupt edge from which oil flowing over the face towards the surface will be thrown by centrifugal force as the disc rotates, and an annular groove in said peripheral surface adjacent to but spaced from said abrupt edge, said groove having a closed end of smaller cross-section than the cross-section of its open end and an inclined wall between the closed end and mouth adjacent to the said abrupt edge intersecting the surface to form a second edge from which any oil moving over the first edge on said surface is removed by centrifugal force as the disc rotates.

4,020,711

DRIVE SYSTEM

Gary A. Woollard, Ithaca, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed June 11, 1975, Ser. No. 585,900

Int. Cl.² F16H *9/00*

U.S. Cl. 74—230.17 E **25 Claims**

1. Apparatus for driving accessories (and adapted to be) disposed between a drive shaft connected to an engine in a vehicle and a driven shaft connected to one or more accessories; the combination comprising:

a first variable pulley rotationally associated with the drive shaft and having a fixed flange (adapted for connection) connected to the drive shaft and a movable flange movable axially of said fixed flange and the drive shaft;

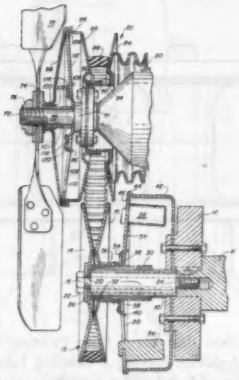
means for moving said movable flange axially away from said fixed flange above a predetermined speed above zero speed of the drive shaft;

said moving means comprising a disc spring (adapted to bias) biasing said movable flange and centrifugally responsive means associated with said disc spring actuated by centrifugal force above (the) said predetermined speed of the drive shaft to change the bias of said spring and effect movement of said movable flange;

a second variable pulley rotationally associated with the driven shaft and the accessories and having a fixed flange (adapted for connection) connected to the driven shaft and a movable flange movable axially of said fixed flange and said driven shaft;

disc spring means urging said movable flange of said second pulley axially toward said fixed flange thereof;

drive means between said variable pulleys effective to provide the drive therebetween with the drive ratio between the pulleys (being) determined by the position of the movable flanges with respect to their respective fixed flanges;



said apparatus being constructed and arranged to provide substantially a fixed ratio drive between the (driving) drive and driven shafts at relatively low (driving) drive shaft speeds and also to provide substantially a constant speed of the driven shaft for speeds for the (driving) drive shaft above said predetermined speed thereof throughout the major portion of the normal vehicle operating range.

4,020,712

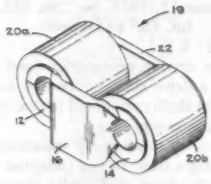
BUSHING LINK CHAIN

John F. McKeon, Carmel, and Roy E. Lambert, Indianapolis, both of Ind., assignors to FMC Corporation, San Jose, Calif.

Division of Ser. No. 535,070, Dec. 20, 1974, Pat. No. 3,931,706. This application June 19, 1975, Ser. No. 588,448

Int. Cl.² F16G *13/06*; B21L *9/02*

U.S. Cl. 74—250 R **4 Claims**



1. In a chain having alternately arranged inside links and outside links, each outside link including two generally parallel pin-link plates that extend longitudinally of the chain to form tension members and two pins that extend transversely of the chain between the pin-link plates to interconnect those plates, each inside link including an inside plate and a bushing link, wherein the improvement comprises a pair of generally cylindrical bushings that extend parallel with each other in a direction transversely of the chain and an integral intermediate web that extends longitudinally of the chain, said bushings having end faces that are generally perpendicular to the direction transversely of the chain in which the bushings extend, said bushings having arcuate portions forming the cylindrical surfaces thereof with those portions of adjacent bushings that are directly opposed to each being the adjacent opposed arcuate portions, said intermediate web extending generally in a plane parallel to the end faces of the bushings between adjacent opposed arcuate portions at adjacent ends of the bushings where the web is integral with the bushings, said bushings having internal bores for receiving the pins of adjacent outside links, said inside plate having openins therein for receiving pins of adjacent outside links.

4,020,713

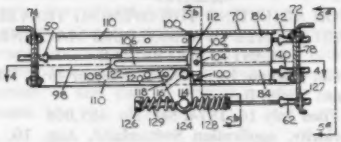
STATION CONTROL SELECTION SYSTEM

George A. Cantley, Akron, and John E. Litzell, Hudson, both of Ohio, assignors to Incom International Inc., Pittsburgh, Pa.

Filed Oct. 16, 1974, Ser. No. 515,185

Int. Cl.² G05G *5/06*

U.S. Cl. 74—479 **21 Claims**



1. A control selector mechanism comprising:

a support housing;

a pair of input members, each of which is slidably mounted within said support housing and capable of responding to a linear input movement having predetermined limits;

an output member mounted within said support housing for sliding in a direction generally parallel with said pair of input members;

means for connecting said output member to one of said pair of input members and for simultaneously disconnecting said output member from the other of said pair of input members so that said output member will produce a linear output movement corresponding to said linear input movement of said one of said pair of input members; and

means for initiating said actuation of said connecting and disconnecting means independently of the relative positions of said one of said other of said pair of input members.

4,020,714

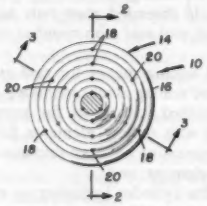
FILAMENT CONNECTED RIM ROTOR

David W. Rabenhorst, Clarksville, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Dec. 4, 1975, Ser. No. 637,689

Int. Cl.² G05G *1/00*

U.S. Cl. 74—572 **17 Claims**



1. An inertial energy storage device for rotation about a shaft comprising:

rim means carried on the shaft and comprised of a plurality

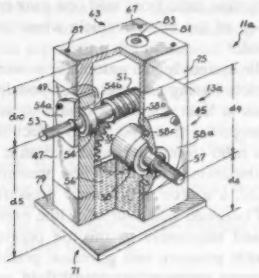
of annular rim elements formed of essentially anisotropic material having substantial tensile strength along longitudinal axes thereof; and,

means for holding certain of the rim elements together at selected locations of the rims means, said means being located along at least one radius extending from the axis of rotation of the rim means and being disposed at alternate intersections of the radius and the physical interfaces between the rim elements.

4,020,715
SPEED REDUCER AND HOUSING THEREFOR

Merle L. Sollars, Wellington, Ill., assignor to Steel Belt, Inc., Wellington, Ill.

Filed Mar. 27, 1975, Ser. No. 562,638
Int. Cl.² F16H *57/02*
U.S. Cl. 74—606 R **4 Claims**

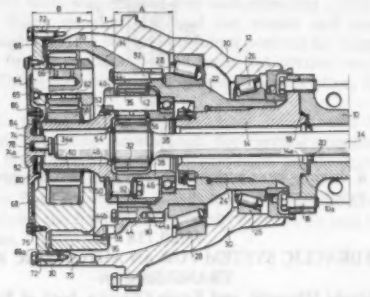


1. A gear speed reducer comprising a gear train a plurality of power transmission shafts associated with said gear train; a housing body having walls defining a chamber containing said gear train and shafts, said walls having openings therein through which the shafts extend, said housing body also having two further openings communicating with said chamber other than any of the shaft openings, said further openings being defined respectively by opposing ends of said walls and in parallel planes normal to said walls, said further openings having respective areas substantially equal to the cross sectional area of said chamber taken in a plane normal to said walls, each of said opposing ends of the walls providing a sealable interface for said body about one of said further openings; a first end member for mounting said reducer, said first end member having a mounting plate and an interfacial portion complementing both of the sealable body interfaces and being removably attached to said body on one of the interfaces, forming an oiltight seal thereat and closing the end of the body associated therewith; and a second end member having an interfacial portion complementing both of the sealable body interfaces and being removably attached to said body on the other of the interfaces, forming an oiltight seal thereat and closing the end of the body associated therewith, whereby assembly of the gear train within the chamber is facilitated and the size of said housing body can be minimized for a given distance between said shafts independently of the mounting dimensions and thermal rating of the gear speed reducer.

4,020,716
PLANETARY TRANSMISSION WHEEL DRIVE MECHANISM

István Tóth, and Kálmán Prépost, both of Gyor, Hungary, assignors to Magyar Vagon- es Gepgyar, Gyor, Hungary

Filed Jan. 15, 1976, Ser. No. 649,354
Claims priority, application Hungary, Feb. 14, 1975, MA 2654
Int. Cl.² F16H *57/10, 1/28, 35/00;* **B60K** *17/04*
U.S. Cl. 74—768 **2 Claims**



1. In a planetary transmission wheel drive mechanism, particularly for applying driving torque to the driving wheels of heavy duty ground engaging vehicles such as trucks, tractors and the like, a first planetary gear set having a non-rotatable axle housing, a hollow spindle fixed to said non-rotatable axle housing, a hub splined to said hollow spindle, a wheel drum rotatably supported by said hub, a drive shaft rotatable in said hollow spindle, a first sun gear on said drive shaft, a first planetary carrier rotatably mounted in said hub, a first set of planetary pinion gears supported by said first planetary carrier, a first gear ring meshing with said first set of planetary pinion gears, and a second planetary gear set having an exchangeable extension removably fixed to said first planetary carrier, a second sun gear splined to said exchangeable extension, a second planetary carrier fixed to said wheel drum, a second set of planetary pinion gears supported by said second planetary carrier and meshing with said second sun gear, a second gear ring meshing with said second set of planetary pinion gears, said first gear ring being detachably connected to said hub and forming a constructional unit with said second gear ring.

4,020,717
CONTROLLING ROTARY MECHANISMS

Neville Robert Johnson, Port Elizabeth, South Africa, assignor to Bus Bodies (S.A.) Limited, Port Elizabeth, South Africa

Filed Aug. 28, 1975, Ser. No. 608,654
Claims priority, application South Africa, Sept. 18, 1974, 74/5939
Int. Cl.² F16H *1/28;* **B60N** *1/02*
U.S. Cl. 74—804 **6 Claims**

1. A rotary mechanism having two members, the relative rotary positions of which are to be controlled, the mechanism including:

a rotatable drive shaft on which the two members are coaxially mounted;

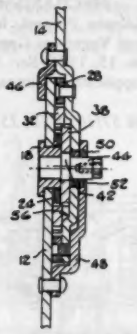
an eccentric fixed to the drive shaft;

an internally toothed ring gear on one of the two members and co-axial with the drive shaft;

an externally toothed pinion on the other of the two members and co-axial with the drive shaft; and

an intermediate gear rotatably mounted on the eccentric and having external teeth in mesh with the ring gear and internal teeth in mesh with the pinion, the internal and external teeth on the intermediate gear being selected to

permit an eccentric movement of the intermediate gear about the pinion and within the ring gear thereby to cause



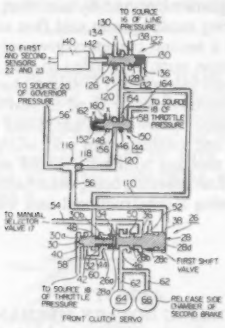
a driving inter-action between the two members upon rotation of the drive shaft.

4,020,718

HYDRAULIC SYSTEM FOR AN AUTOMATIC POWER TRANSMISSION

Toshiyuki Miyauchi, and Kunio Ohtsuka, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 332,400, Feb. 14, 1973, abandoned. This application Feb. 26, 1975, Ser. No. 553,324
Claims priority, application Japan, Feb. 15, 1972, 47-15917
Int. Cl.² B60K 41/18
U.S. Cl. 74—869 **12 Claims**


TO SOURCE #1 OF LINE PRESSURE
TO FIRST AND SECOND SENSORS 22 AND 23
TO SOURCE 20 OF GOVERNOR PRESSURE
TO SOURCE #3 OF THROTTLE PRESSURE
TO MANUAL SELECTOR VALVE 17
FIRST SHIFT VALVE
TO SOURCE #3 OF THROTTLE PRESSURE
RELEASE SIDE CHAMBER OF SECOND BRAKE
FRONT CLUTCH SERVO

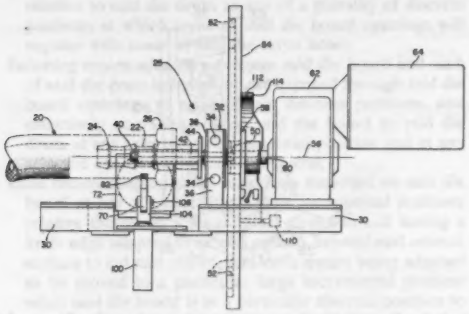
1. A hydraulic system for an automatic power transmission of a motor vehicle having an accelerator pedal, which power transmission has at least one servo means to actuate friction elements of the power transmission to effect shift from one gear reduction ratio to another, said hydraulic system comprising, in combination, a source of line pressure, a source of throttle pressure, a source of governor pressure, a first shift valve disposed between said source of line pressure and said servo means and including a valve spool movable between two extreme positions to control fluid communication between said source of line pressure and said servo means, said first shift valve having a throttle pressure port and a governor pressure port, said throttle pressure acting on said valve spool at one end thereof to move the same toward a position to effect downshifting, said governor pressure acting on said valve spool at the other end thereof to move the same toward another position to effect upshifting, first conduit means interconnecting said throttle pressure port with said source of throttle pressure, second conduit means interconnecting said governor pressure port with said source of governor pressure, third conduit means hydraulically connected to said source of line pressure and communicable with said second conduit means, a check valve disposed between said second conduit means and said third conduit means and having a floating ball normally assuming a position to admit governor pressure into said governor pressure port of said first shift valve through said second conduit means, sensing means responsive to a released condition of the accelerator pedal and generating an electrical signal indicative thereof, and a second shift valve disposed in said third conduit means and communicating with said source of line pressure and including a valve spool normally held in position to close said third conduit means, said second shift valve also including an electrical actuating means cooperating with the valve spool of said second shift valve, said electrical actuating means being responsive to said electrical signal for moving said valve spool of said second shift valve to a position to open said third conduit means for thereby admitting line pressure into said third conduit means to cause the floating ball of said check valve to move to a position to prevent supply of governor pressure into said second port of said first shift valve while permitting flow of line pressure thereinto, whereby the valve spool of said first shift valve is exposed to said throttle presssure and said line pressure which is higher than said governor pressure and assumes one of said two extreme positions in dependence on the values of said throttle pressure and said line pressure thereby to cause said power transmission to effect shift into a lower gear reduction ratio from said one gear reduction ratio to prevent creep of the motor vehicle when the accelerator pedal is released.

4. A hydraulic system for an automatic power transmission of a motor vehicle having an accelerator pedal, which power transmission has at least one servo means to actuate friction elements of the power transmission to effect shift from one gear reduction ratio to another, said hydraulic system comprising, in combination, a source of line pressure, a source of throttle pressure, a source of governor pressure, a first shift valve disposed between said source of line pressure and said servo means and responsive to throttle pressure from said source of throttle pressure and governor pressure from said source of governor pressure to control fluid communication between said source of line pressure and said servo means, said first shift valve having a throttle pressure and a governor pressure port, first conduit means interconnecting said throttle pressure port with said source of throttle pressure, second conduit means interconnecting said governor pressure port with said source of governor pressure, third conduit means hydraulically connected to said source of line pressure and communicable with said second conduit means, sensing means responsive to a released condition of the accelerator pedal and generating a signal indicative thereof, and a second shift valve disposed in said third conduit means and communicating with said source of line pressure, said second shift valve including a valve spool normally held in position to close said third conduit means and an actuating means cooperating with the valve spool of said second shift valve, said actuating means being responsive to said signal for moving the valve spool of said second shift valve to a position to open said third conduit means for thereby admitting line pressure to said third conduit means through which the line pressure is passed to said governor pressure port of said first shift valve, whereby said first shift valve is responsive to said throttle pressure and said line pressure which is higher than said governor pressure and operative to shift the flow of said line pressure being supplied to said servo means in dependence on the instantaneous values of said throttle pressure and said line pressure to cause said power transmission to shift into a lower gear reduction ratio from said one gear reduction ratio to prevent creep of the motor vehicle when the accelerator pedal is released.

4,020,719
SECURING A COUPLING TO A HOSE

Stanley J. Houck, Akron, and Michael W. Smith, Mogadore, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 19, 1976, Ser. No. 687,776
Int. Cl.² B25B 27/10
U.S. Cl. 81—9.3 3 Claims

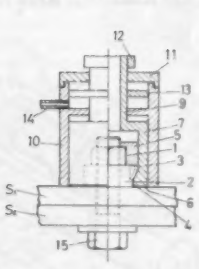


1. Apparatus for applying a clamp for securing an end of hose to a hose coupling, which clamp has a loop end and a free end, the free end being placed through the loop end to form a ring, the apparatus comprising a crosshead having a cam track follower, an arbor mounted on the crosshead and extending outward therefrom to support the coupling and hose end thereon, a slide supporting the crosshead for movement perpendicular to the arbor, a circular plate mounted for rotation about an axis parallel to the arbor and having a cam track operable to move the follower and crosshead toward and away from said axis, tensioning means extending parallel to the plate having a hook engageable with the loop end, a grip engageable with the free end of the clamp and a cylinder operable to move the grip toward and away from the hook, lift means connected to the tensioning means and cooperable with the cam track to effect relative rotation of the coupling and hose end around the hook.

4,020,720
APPARATUS FOR TIGHTENING HIGH-STRENGTH STEEL BOLTS

Kaneharu Fujii, No. 502, Tatzunodai, Zama Kanagawa, Japan

Division of Ser. No. 584,028, June 4, 1975, abandoned. This application Dec. 12, 1975, Ser. No. 640,264
Int. Cl.² B25B 29/02
U.S. Cl. 81—57.38 3 Claims



1. An apparatus for tightening a nut and bolt combination under a pretensioned condition, said apparatus comprising:

an externally threaded bolt;

nut means threaded onto said bolt for securing said bolt in position, said nut means comprised of:

an upper nut portion threaded to said bolt, and

a lower nut portion on the side of said upper nut portion opposite the end of said bolt having a diameter greater than said upper nut portion and having first cutout portions about the circumference thereof forming a plurality of first projections about said lower nut portion;

a nut fitting member fitted over and engaging said upper nut portion, said member having a plurality of second cutout portions therein corresponding to said first cutout portions in said lower nut portion therebeneath;

rotatable hook means fitted over and extending above said nut fitting member and said nut means and passing through said first and second cutout portions for engaging said first projections on said lower nut portion and said nut fitting member and for rotating said nut fitting member;

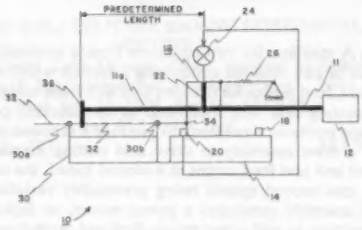
cylinder means surrounding said hook means, said hook means extending therethrough, for exerting pressure on said hook means and causing said hook means engaging said lower nut portion to rise upward; and

pressure fluid supply means directed into said cylinder for supplying the fluid thereto to exert pressure on said hook means.

4,020,721
APPARATUS AND METHOD FOR CUTTING CONTINUOUS STOCK

Russell W. Eakins, and Robert August Hagan, both of North Vernon, Ind., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,388
Int. Cl.² B26D 1/56
U.S. Cl. 83—37 10 Claims



1. Apparatus for cutting continuous strip stock into severed sections of predetermined lengths and wherein said continuous stock is curved, said apparatus comprising, in combination:

a guide base;

a cutting die housing slidably mounted to said guide base for translation in a given direction between first and second positions and said die housing including means for cutting said strip;

a strip guide frame fixedly mounted relative to said guide base and wherein said strip guide frame includes guide means disposed along a curved path accomodating said curved stock;

a rigid member slidably carried by said guide frame and connected to said die housing and extending away from said die in the general direction of movement of said strip stock;

a stop member fixedly attached to said rigid member at a predetermined point thereon, said stop member being adapted to engage the fed end of said strip;

means for moving said strip through said die housing and toward said stop member; and,

means for actuating said cutting means when said die housing is translated to said second position by the motion of

said rigid member in response to the movement of the engaged fed end of said strip.

4,020,722

MACHINE DRIVE ASSEMBLIES

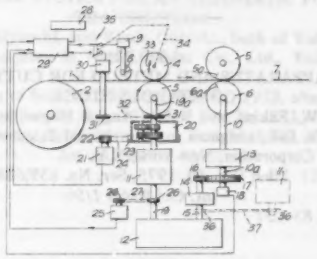
Graham A. B. Byrt, and John E. Mockett, both of Bristol, England, assignors to Masson Scott Thrissell Engineering Limited, Bristol, England

Filed Oct. 16, 1975, Ser. No. 623,165

Claims priority, application United Kingdom, Oct. 24, 1974, 46134/74

Int. Cl.² B26D *5/00*

U.S. Cl. 83—74 7 Claims



1. A machine for cutting sheets from a continuous web of paper or like material comprising a reel on which said web is wound, feed means for drawing said web from said reel, means for cutting said web transverse to its direction of travel at spaced positions therealong to produce a succession of sheets, and a drive assembly to drive said cutting means at a first speed and said feed means at a second speed, the ratio of said first and second speeds being presettably variable, wherein said assembly comprises a prime mover, an input shaft for connection to said prime mover, first and second output shafts for connection to said cutting means and said feed means respectively, a differential gear having three input/outputs, speed regulating means, an auxiliary input connection connected to said speed regulating means, a gear box settable to provide any one of a plurality of speed ratios, said gear box being connected between said first output shaft of said assembly and one input/output of the differential gear, a second input/output of said differential gear being connected to said auxiliary input connection and the third input/output of the differential gear being connected to the second output shaft of said assembly, means to monitor the rate of web feed, first sensing means for producing signals indicative of the rate of web feed, second sensing means for producing signals indicative of the rotational speed of said first output shaft, third sensing means for producing signals indicative of the rotational speed of said second output shaft, presettable means for producing a signal indicative of the desired length of sheet to be cut from said web, and control means electrically connected to all said sensing means and to said presettable means, wherein said control means is adapted to produce an error signal indicative of any difference between the length of web being fed by said feed means and said desired length of web being fed by said feed means and said desired length, said speed regulating means being arranged to receive said error signal and adapted to respond thereto in such sense as to reduce said difference.

4,020,723

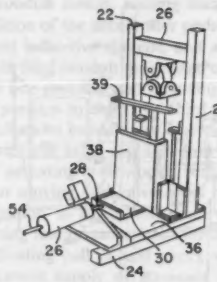
TENSILE TEST SAMPLE MAKING MACHINE

Andrew B. Nix, Altoona, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 16, 1975, Ser. No. 623,126

Int. Cl.² B26D *5/20*

U.S. Cl. 83—268 4 Claims



1. Apparatus for die cutting tensile test samples from a slab of solid propellant comprising:

a. support means including a base member;

b. storage means for retention of said slabs thereof in stacked relation, said storage means being in spaced relation with the upper surface of said base member and open at its bottom whereby the bottom slab assumes a first position in said space between said upper surface and said storage means;

c. feed means for engagement with said bottom slab for movement thereof to a second position;

d. stop means for retention of said slab in said second position, said stop means including a pair of pins extending through openings in said base member, a plate having said pins secured thereto, said plate being secured in biased relation to the bottom surface of said base and provided with a downwardly extending lip, an L shaped member secured to said feed member and extending under said base member for engagement with said downwardly extending lip for upward pivotal movement of said pins through said base member;

e. cutting means disposed for cutting said slab to a predetermined configuration responsive to movement of said slab to said second position.

4,020,724

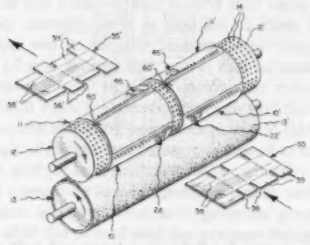
ROTARY CUTTING DIE

Albert J. Quinlan, 124 Ward Road, North Tonawanda, N.Y. 14120

Filed Feb. 6, 1975, Ser. No. 547,783

Int. Cl.² B26D *1/12*; B31B *1/16*

U.S. Cl. 83—346 10 Claims



1. A rotary cutting die adapted to be adjustably mounted on a rotatable cylindrical die drum of a rotary press to cut a planar object passed between such rotating die drum and an oppositely-rotating cooperative anvil drum of said press, said

die drum having at least one longitudinal row of uniformlyspaced radially-extending tapped holes, comprising:

a die board having a concave surface adapted to cover a cylindrical surface portion of said die drum, an opposite convex surface, and a plurality of longitudinally spaced circumferentially-elongated openings extending radially therethrough, said die board being adapted to be selectively moved circumferentially relative to said die drum to an infinite number of positions and longitudinally relative to said die drum to any of a plurality of discrete positions at which some of said die board openings will register with some of said die drum holes;

fastening means adapted to engage said die board and such of said die drum holes which are exposed through said die board openings at each of said discrete positions, and selectively operable to hold said die board to said die drum at any selected circumferential position and at any selected one of said discrete positions;

knife means adapted to be selectively mounted on said die board at any of a plurality of large incremental positions relative thereto in a longitudinal direction and having a knife edge adapted to extend radially beyond said convex surface to cut said object, said knife means being adapted to be moved to a particular large incremental position when said die board is in a particular discrete position to enable said knife edge to be coarsely positioned relative to said die drum at any of a plurality of small incremental positions spaced evenly from one another, said knife means being also adapted to be further displaced relative to said die board from each of said large incremental positions to enable said knife edge to be finely positioned relative to said die drum at any position between said small incremental positions; and

holding means mounted on said die board and selectively operable to hold said knife means at any selected position relative to said die board;

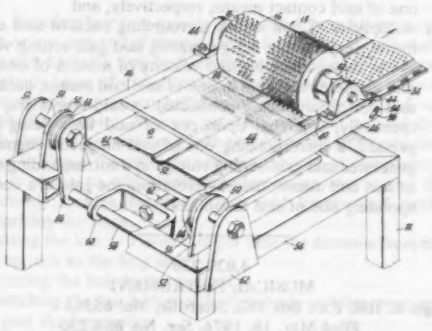
whereby by such selective positioning of said die board and by such coarse and fine positioning of said knife means, said knife edge may be adjustably mounted on said die drum at any desired position in a circumferential direction, and at any desired position in a longitudinal direction.

4,020,725

PERFORATING APPARATUS

Benjamin G. Climo, Pont Rouge, Canada, assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Aug. 27, 1975, Ser. No. 608,070
Int. Cl.² B23D *25/04*; B26F *1/10*
U.S. Cl. 83—349 **7 Claims**



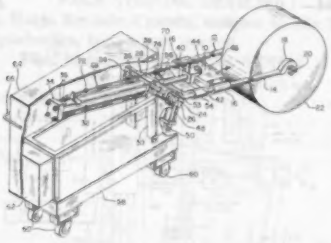
1. In an apparatus for perforating sheet material, guide means for guiding the sheet material for movement in a predetermined plane during perforation of the sheet material, rotary punch-mounting means, and support means supporting said rotary punch-mounting means for rotation in a given direction about an axis parallel to and spaced from said plane, with said axis extending transversely with respect to the direction of travel of the sheet material in said plane, said rotary punch-mounting means including a plurality of uniform thickness adjacent flat circular discs each having a plurality of substantially semi-circular cavities radially disposed about the periphery of said discs, each of said cavities being disposed adjacent a similar cavity on the adjacent flat circular disc to form a circular punch receiving aperture, and a plurality of circular punches carried by said punch-mounting means and located in said punch receiving apparatus for rotary movement in said given direction therewith about said axis, axial clamping means carried by said support means for holding said adjacent circular discs in tight clamping relation with said punches and acting as the sole means for securing said punches upon said punch mounting means, said punches extending outwardly beyond said punch-mounting means through a distance sufficient to pierce through the sheet material in said plane, so that during rotary movement of said punch-mounting means said punches approach said plane, contact and punch through the sheet material in said plane and then are retracted from the sheet material, each of said punches having an outer punching end which is concave and forms part of a cylinder whose axis is perpendicular to the axis of the punch and parallel to the axis around which said punch-mounting means turns, said concave punching end being offset to the axis of each said punch to form a curved leading punch tip and a curved trailing punch tip, the radial distance of said leading punch tip to the axis of rotation of said punch-mounting means being less than the radial distance of said trailing punch tip so that each curved tip contacts the sheet material to be punched substantially simultaneously.

4,020,726

SHEET ROLL SPLITTER HAVING HORIZONTAL CUTTER

John N. Coats, Lake Oswego, Oreg., assignor to Industrial Research & Engineering, Inc., Portland, Oreg.

Filed Jan. 23, 1976, Ser. No. 651,637
Int. Cl.² B26D *5/04*
U.S. Cl. 83—397 **12 Claims**



1. Roll splitter apparatus for cutting a roll of sheet material, comprising:

roll engaging means provided at the opposite ends of the roll;

cutter means including a blade mounted on support means for substantially horizontal movement of said blade;

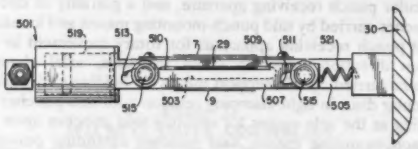
holding means for gripping said roll engaging means at the opposite ends of the roll and for holding said roll against horizontal movement away from the cutter; and

drive means for moving said blade from a retracted position to an extended position toward said roll to cut the sheet material as the blade moves radially inward toward the center of the roll.

4,020,727
AUTOMATIC CAPACITOR WINDING MACHINE

Fredric S. Miller, Wayne, N.J., assignor to Universal Manufacturing Corporation, Paterson, N.J.

Filed Mar. 25, 1975, Ser. No. 562,011
Int. Cl.² B26D 5/08
U.S. Cl. 83—580 8 Claims

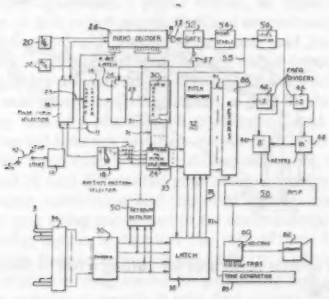


1. A knife for cutting strip comprising:
a knife body having a bearing surface;
a channel formed through said body and opening onto said bearing surface having a long axis in said body adapted to receive said strip;
two pins having ends affixed to said body on said bearing surface;
a blade member slidably mounted on the bearing surface; and
two slots in said blade member, one of which is substantially straight and the other arcuate, both slots being oriented at substantially the same oblique angle to the long axis of said channel, each slot receiving a shank portion of a respective pin, whereby said blade member is guided by said pins over said knife body in a direction both parallel and perpendicular to the long axis of said channel such that said blade progressively covers said channel starting at one end of said channel and continuing to the other end of said channel to cut the strip passing through the channel.

4,020,728
ELECTRONIC ORGAN WITH AUTOMATIC KEYING OF PEDAL NOTES

John William Robinson, and Patrick King Doane, both of Jasper, Ind., assignors to Kimball International, Inc., Jasper, Ind.

Filed Oct. 24, 1975, Ser. No. 625,528
Int. Cl.² G10H 1/00, 5/00
U.S. Cl. 84—1.03 21 Claims

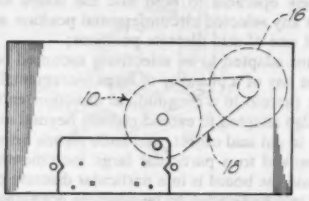


1. The method of playing rhythmic note patterns in an electronic organ having depressable playing keys, a tone generator and electroacoustic means, which comprises; supplying identical trains of rhythmic pulse patterns repetitively, enabling one of a group of decoders on each pulse of each said train, detecting the depressing of a playing key and encoding a signal in conformity with the playing key depressed, supplying the encoded signal to the decoder as an addressing input thereto to enable a respective output of the enabled decoder, actuating a respective first keyer interposed between the tone generator and the electroacoustic means for each enabled output of the decoders to key a respective pitch, and actuating a second keyer interposed between the first keyer and the electroacoustic means on selected ones only of the pulses of each pulse train.

4,020,729
MUSICAL INSTRUMENT WITH PRERECORDED TONES ON TAPE

Roland J. Guillemette, 762 High St., North Bay, Ontario, Canada

Filed Feb. 18, 1976, Ser. No. 658,891
Int. Cl.² G01H 3/04; G10H 1/02
U.S. Cl. 84—1.28 5 Claims



1. A musical instrument comprising:
a multiplicity of elongated circular endless magnetizable tapes, each of said tapes having a plurality of different tracks, a different note being recordable magnetically on each of said tracks, each of said tapes being of sufficient length to accomodate the tone of each of said notes on each of said tracks, respectively;
a multiplicity of non-magnetizable supports mounted coaxially for supporting said tapes, respectively;
drive means for rotating said supports and said tapes;
a multiplicity of magnetic pick-up heads for each of said tracks, said heads being in sufficient proximity to said tracks, respectively, to be energized thereby;
a multiplicity of amplifiers having a gain in dependence on a gain-setting voltage, said amplifiers having inputs connected to said magnetic pick-up heads, each of said amplifiers being separately energizable;
a multiplicity of keys, each of said keys having contact means for energizing each of said amplifiers, respectively;
a multiplicity of magnetic elements pivotable by each of said keys, respectively, upon depression of one of said keys from a first position to a second position at a velocity of motion, the pivoting of one of said elements actuating one of said contact means, respectively; and
a multiplicity of coil means surrounding each of said elements, respectively, for generating said gain-setting voltage in dependence on said velocity of motion of one of said elements movable in one of said coil means, each of said coil means being connected to said amplifiers, respectively, whereby, upon one of said keys being depressed, a corresponding one of said magnetic elements generates said gain-setting voltage in a corresponding one of said coil means, thereby presetting the gain in a corresponding one of said amplifiers.

4,020,730
MUSICAL INSTRUMENT

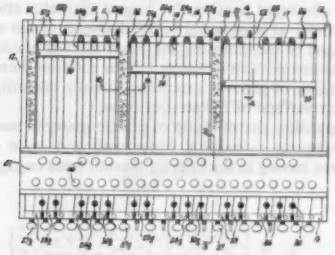
Elgie E. Hill, P.O. Box 162, Steelville, Mo. 65565

Filed Mar. 18, 1976, Ser. No. 668,230
Int. Cl.² G10D 1/00
U.S. Cl. 84—173 9 Claims

1. In a musical instrument:
a. a body,
b. a pair of string bridges mounted on and extending transversely of the body,

c. a plurality of string sets extending between and across the string bridges, each string set constituting an octave and being disposed laterally adjacent on the body,

d. a plurality of slide bars mounted on the body, each slide bar extending across and slidably engaging the strings of one string set to achieve selectively the key for the associated string set,



e. a plurality of string strikers mounted on the body for selectively striking the strings, and

f. finger-actuating means operatively connected to the string strikers for selectively moving the string strikers into engagement with the strings.

4,020,731

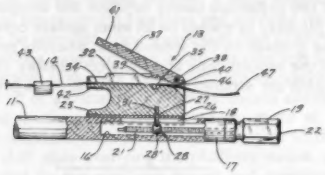
METHOD OF SECURING HAIR TO A MUSICAL INSTRUMENT BOW

Myron E. Darling, 515 Ohio St., Webster City, Iowa 50595

Division of Ser. No. 489,822, July 18, 1974, Pat. No. 3,919,912. This application July 31, 1975, Ser. No. 600,734

Int. Cl.² G10D *1/02*

U.S. Cl. 84—282 **1 Claim**



1. Securing hair to a musical instrument bow having a rod, a tip unit at one end of the rod, and a longitudinally adjustable frog unit having a frog body at the other end of the rod, said frog body being of a type having a longitudinal cavity therein, a transverse depression being formed in the bottom of said longitudinal cavity, a cover pivotally attached to said frog body along a transverse axis with respect to the frog body, said cover having a transversely oriented projection complementary in shape to said transverse depression and means for selectively locking the cover into said longitudinal cavity comprising the steps:

cutting the hair to a length longer than the distance from the tip unit to the frog unit;

securing the hair to the tip unit;

stretching the hair between the frog body and the cover and past the frog unit;

pivoting the cover into the longitudinal cavity and said projection into said transverse depression whereby said hair is clamped between the cover and the frog body;

locking the cover with respect to the frog body to thereby hold the hair in its clamped position; and

cutting off the excess hair at the frog unit.

4,020,732

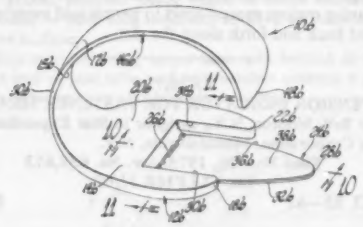
PICK FOR STRINGED INSTRUMENTS

Fred Kelly, Box 471, Grayling, Mich. 49738

Filed Oct. 24, 1975, Ser. No. 625,469

Int. Cl.² G10D *3/16*

U.S. Cl. 84—322 **15 Claims**



1. A pick for a stringed musical instrument, comprising a pick body, and a pick blade adapted for engaging a string of an associated stringed musical instrument, said pick body comprising first and second body portions spaced from each other and respectively having first and second free ends, said pick body further comprising a body bight portion joining said first and second body portions as to thereby define a generally U-shaped configuration with said first and second body portions comprising arms of said U-shaped configuration, said blade having a cross-sectional thickness and a width as to have said thickness of a dimension less than the average dimension of said width, said blade being operatively carried at one end thereof by said pick body and being so positioned as to be generally medially disposed between said first and second body portions as to have said width of said blade extending generally in the direction in which said first and second body portions are spaced from each other, said blade comprising a second free end opposite to said one end thereof and projecting a substantial distance beyond said first and second free ends of said first and second body portions and said cross-sectional thickness of said blade being significantly less than the cross-sectional thickness of said first and second body portions.

4,020,733

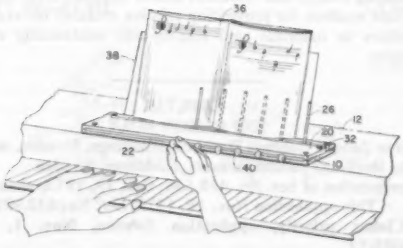
PAGE TURNING DEVICE

Carl H. J. Hatje, Rexdale, Canada, assignor to The Raymond Lee Organization, Inc., a part interest

Filed May 6, 1976, Ser. No. 683,912

Int. Cl.² G10G *7/00*

U.S. Cl. 84—503 **4 Claims**



1. A page turning device comprising:

a first horizontal elongated plate having a longitudinally extending slot therein;

a plurality of vertical L shaped members, each member having a bottom horizontal leg disposed at right angles to the slot and an upwardly disposed vertical leg;

a like plurality of soft yeildable elements manually slidable in the slot, each horizontal leg extending through a corresponding element and overlying the top surface of said first plate; and

a second horizontal plate secured to the top surface of the first plate, said vertical legs being disposed adjacent one edge of the second plate, said first and second plates having regions spaced apart to permit said members to be slid back and forth along the slot.

4,020,734

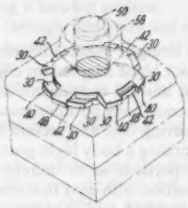
TENSION INDICATOR FOR FASTENER MEANS

Walter Bell, Monroe, N.Y., assignor to Star Expansion Industries Corporation, Mountainville, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,613

Int. Cl.² F16B *31/02*

U.S. Cl. 85—62 **8 Claims**



1. A tension indicator for use with fastener means such as cooperating nut and bolt that are adapted to be applied to a workpiece, said tension indicator comprising a pair of washers adapted to be placed on the fastener means between a load applying surface thereof and the workpiece, each of said washers including opposing concave and convex surfaces, a central portion of each of said washers having a hole therethrough from said concave surface to said convex surface for receiving the fastener means, the concave surfaces of the pair of washers facing in opposite directions toward each other in an assembled condition, each of said washers further including at least one finger extending outwardly from said central portion, said one finger of each washer including an outermost end face disposed between opposing faces integrally extending from said concave and convex surfaces and between opposing sides thereof, said one finger of each washer being disposed in a side-by-side relationship to each other in said assembled condition with one of said sides of each finger being adjacent to each other, said end faces being inclined at different angles with respect to each other in said assembled condition without any load being applied to said washers, said end faces of said fingers being aligned side-by-side with each other only when a predetermined load has been applied to said washers and the fastening means, and retention means disposed on at least one of said washers for preventing relative rotation between said washers to maintain said side-by-side relationship of said fingers.

4,020,735

EXPANSION BOLT

Istvan Jahnos Gohliart Herback, Huddinge, Sweden, assignor to Herbacks Industrikonsult, Huddinge, Sweden

Continuation of Ser. No. 410,556, Oct. 29, 1973, abandoned. This application Nov. 18, 1975, Ser. No. 632,901

Claims priority, application Sweden, Nov. 1, 1972, 14095/72

Int. Cl.² F16B *13/06*

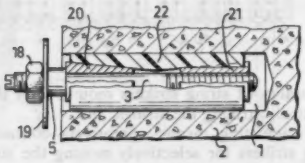
U.S. Cl. 85—67 **5 Claims**

1. An expansion bolt comprising:

a cylindrical metallic shank having an externally threaded end portion, an opposite end portion adapted to be connected to a load carrying attachment device subsequent to anchoring the bolt in a cylindrical hole and a cylindrical abutment portion having a shoulder with a diameter greater than the remainder of the shank and disposed adjacent the opposite end portion between the end portions;

two metallic expansion cones having axially extending holes therethrough and disposed on the shank so that their narrow ends oppose each other, a first of the cones being free to rotate about the shank and disposed with its largest diameter end in abutting relation to the shoulder of the abutment portion, the largest diameter end having a diameter at least equal to the diameter of the shoulder, a second of the cones having inner threads mating with the threaded portion of the shank for rotation thereon, and a plurality of grooves extending radially inwardly from the outer surface of the second cone;

an expansion sleeve made of plastic material and having a continuous cylindrical outer wall and open ends, said sleeve having in the interior thereof seats engageable with



the cones, said seats being conical and corresponding to the outer configuration of the cones and extending from the large diameter of each conical seat from opposed open ends of the sleeve and intersecting and terminating at a point substantially halfway between the ends of the sleeve, each of said cones being movable into and out of the respective open end of said sleeve so that the larger ends of said cones can reside outside the ends of said sleeve, said sleeve having internal axially extending weakening grooves for permitting the wall of the sleeve to separate along the grooves when the sleeve is stretched outwardly by action of the cones thereby forming a number of parallel separate sleeve segments, the end portion of the expansion sleeve adjacent the second cone having a plurality of splines on its inner surface corresponding to the grooves on the second cone whereby mutual rotation of the second cone and the sleeve before the sleeve segments are separated from each other, is prevented.

4,020,736

AUTOMATIC INCREMENT SIZER-FEEDER FOR PRESS LOADING

Robert Petersen, Williamsburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 29, 1976, Ser. No. 671,524

Int. Cl.² F42B *33/02*

U.S. Cl. 86—20 B **3 Claims**

1. An automatic press for loading projectiles with powdered explosive comprising:

a fixed lower platen for supporting projectile cases to be loaded;

an upper platen movable toward and away from said lower platen;

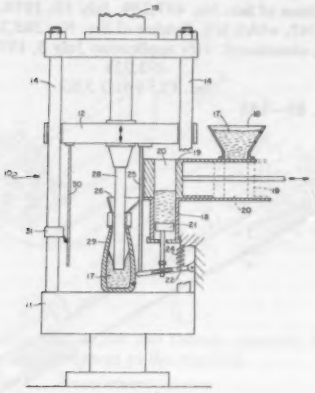
a hopper for holding a supply of powdered explosive;

variable means for feeding increments of explosive into the projectile on said lower platen;

a ram carried by said upper platen for compacting explosive in said projectile; and

means for adjusting said variable feeding means in response

to the extent of ram travel into the projectile whereby the size of the succeeding increment of explosive is directly



proportional to the void volume remaining in the projectile.

4,020,737

CARTRIDGE LOADING MACHINE

Charles R. Ranson, 28412 Crachman Lane, Highland, Calif. 92346

Continuation-in-part of Ser. No. 385,921, July 26, 1973, abandoned. This application May 19, 1975, Ser. No. 578,410

Int. Cl.[2] F42B *33/02*

U.S. Cl. 86—23 10 Claims

1. In a cartridge reloading machine, in combination: platform means and cartridge case moving means movable between a plurality of processing stations; a head mounted over the position of the procesing stations; a head mounted over the position of the processing stations; a head mounted over the position of the processing stations and carrying die means positioned to be operable upon a cartridge case at each of the individual stations, said cartridge moving means comprising a manually movable shift plate having portions engageable with cartridges at all of a plurality of stations; means constraining said plate for movement to simultaneously move all of the plurality of cartridges from an individual station to the next station, said shift plate overlying the platform means, a guide member carried by the platform means and constrained to move in a direction normal to a line of stations, the shift plate having engagement with the guide member whereby the shift plate is constrained to move with the guide member in directions normal to a line of stations and means whereby the shift plate can move relative to the guide member in directions parallel to a line of stations, the shift plate thereby being constrained to rectangular movement, and means limiting the said normal and parallel movements, the machine having a station at which a new primer is delivered to the station and set in the cartridge and means movable by the shift plate for delivering a primer to the station and upwardly actuatable stem means actuatable with movement of the head for setting a primer in the cartridge.

4,020,738

RECEIVER FOR SPENT SHELLS

Javier A. Martinez, 7512 Cravell Ave., Pico Rivera, Calif. 90660

Filed Oct. 14, 1975, Ser. No. 622,021

Int. Cl.[2] F41C *27/00*

U.S. Cl. 89—33 F 1 Claim

1. A shell receiving device for a pistol having a barrel and a handgrip, said device comprising;

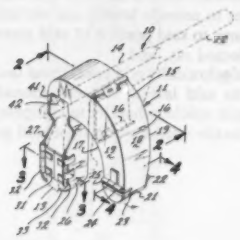
a tube having a pair of side members, a top member and a bottom member;

said side members being made of sheet material and having an arch shape;

said top member being made of sheet material and bonded to both side members to have an exposed convex surface;

said bottom member being made of sheet material and bonded to both side members to have an exposed concave surface;

said top member being larger than said bottom so that at one end of said tube said top member extends a greater arc distance than said bottom member;



a first flap attached to said bottom member;

a second flap attached to said top member so that said first and second flaps are substantially in parallel relationship;

a bridging section attached to both said first and second flaps at their adjacent parallel edges so that a U-shaped member is formed;

a removeable plate removeably attached to at least one of said first and second flaps;

a cover closing the other end of said tube;

a door disposed within said tube nearer said one end then said other end and disposed to swing in one direction to allow shells to travel from said one end to said other end.

4,020,739

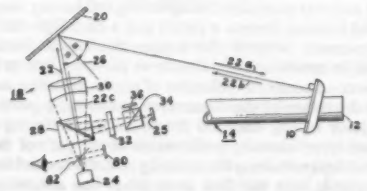
FIRE CONTROL SYSTEM

Casimir F. Piotrowski, Riverton, N.J.; Wright H. Scidmore, Langhorne, Pa.; Robert P. O'Shaughnessy, Voorhees; Nicholas P. Marasco, Beverly, both of N.J.; Louis R. Cerrato, Philadelphia, and Clarence C. Haines, Jr., Levittown, both of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 16, 1976, Ser. No. 705,981

Int. Cl.[2] F41G *3/32*

U.S. Cl. 89—41 ME 7 Claims



1. In a fire control system of the type utilizing a periscope for aiming a cantilevered adjustably mounted gun, and having means to move a movable (rotatable) mirror in said periscope cooperatively with said gun, said system including a range finder cooperatively associated with a ballistic computer for supplying lateral (azimuth) and elevational range signals responsive to said range finder for a predetermined target, and means responsive to said range signals to adjust an adjustable

reticle in said periscope for aiming said gun at said target, the improvement comprising

a flat muzzle mirror fixed to a muzzle of said gun,

a light source disposed to direct a beam of light in a path onto said movable mirror, said beam to be reflected from said movable mirror and to impinge upon said muzzle mirror at a normal thereto only in the absence of gun to periscope positioning errors for all positions of said gun, said beam to be reflected back from said muzzle mirror to said movable mirror, and to be reflected from said movable mirror, as a reflected ray, into said periscope,

a matrix array of photosensitive means disposed to receive said reflected ray on only a portion of said matrix array,

circuit means connected between said matrix array and said computer to provide lateral and elevational error signals in response to said portion of said matrix array receiving said reflected ray, and

means to algebraically add said lateral and elevational error signals to said lateral and elevational range signals to adjust said reticle, whereby to compensate for errors due to the cantilevered mounting of said gun.

4,020,740

FIREARMS FOR SELECTIVELY CONTINUOUS AND NON-CONTINUOUS OPERATION

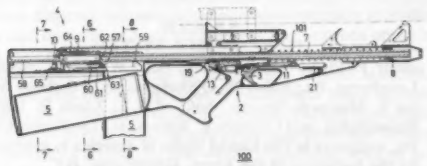
Hans-Ludwig Schirneker, Engelsilt 10, 4773 Moehnesee-Voellinghausen, Germany

Filed Sept. 26, 1975, Ser. No. 617,178

Claims priority, application Germany, Sept. 26, 1974, 2445909

Int. Cl.² F41D *11/10*

U.S. Cl. 89—129 B **24 Claims**



1. In a firearm having a trigger mechanism including an actuating lever and an operating rod disposed above the trigger mechanism and longitudinally reciprocable between forward and rear positions, the operating rod having associated in spaced relation thereto a piston and a cartridge chamber, the improvement wherein the trigger mechanism further comprises, in combination, a first lever movable into at least first and second positions indicative of non-continuous and continuous operation of the firearm, respectively, a portion of the first lever having disposed thereon a first indexing means, a second lever normally positionable in the path of the operating rod for restraining the oerating rod, the second lever being engageable with the first lever when the actuating lever is pulled for moving away from said path, advancing means carried by the second lever, the advancing means including second indexing means engageable with the first indexing means on the first lever when the first lever is in its first position, the advancing means further having third indexing means associated therewith, and transport means coupled to the operating rod and having fourth indexing means engageable with the third indexing means on the advancing means for selectively indexing the second lever away from the first lever.

4,020,741

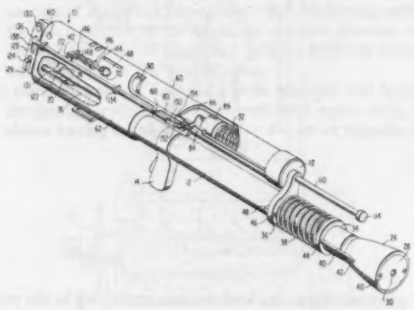
FIREARMS

Ralph D. Junker, 33 N. Main St., Southampton, N.Y. 11968

Division of Ser. No. 487,239, July 10, 1974, Pat. No. 3,990,347, which is a division of Ser. No. 365,246, May 30, 1973, abandoned. This application July 3, 1975, Ser. No. 592,721

Int. Cl.² F41D *5/02*

U.S. Cl. 89—185 **4 Claims**



4. In a firearm comprising barrel means, a charge detonation chamber, bolt means shiftable relative to said chamber, movable locking means including a stop for locking said bolt means against movement away from a charge disposed in said chamber during firing of a projectile, and means for automatically unlocking said bolt subsequent to firing, said unlocking means comprising:

displaceable means mounted adjacent a discharge end of said barrel means for displacement relative thereto, said displaceable means including:

reaction surface means positioned to be acted upon, and displaced, by combustion gases from said barrel means; and

a piston slidably mounted in a muzzle end of said barrel means, said piston having a central aperture for discharging a projectile; and

means connecting said displaceable means with said locking means to shift said locking means to a position unlocking said bolt means in response to firing said firearm;

said connecting means comprising a rod connected to said displaceable means and to said locking means.

4,020,742

ADJUSTABLE STOP DEVICE

Ernest R. Raymond, Washington St., Box 66, Limerick, Maine 04048

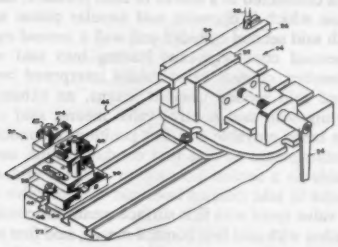
Filed Dec. 2, 1975, Ser. No. 637,041

Int. Cl.² B23B *7/00*

U.S. Cl. 90—11 E **9 Claims**

1. An adjustable stop device for use on the table of a vertical milling machine to position a workpiece held in a vise secured to said table, said stop device comprising a base attachable to the table and spaced apart from the vise, an elongate stop member mounted on the base and extending into the space between said base and said vise for positioning the workpiece in the vise in a desired location, means for adjustable movement of the stop member along a first axis perpendicular to the base, means for adjustable movement of the stop member along a second axis perpendicular to the first axis, means for adjustable movement of the stop member along a third axis perpendicualr to the first and second axis and each of said means for adjustable movement of the stop member having means associated therewith for releasably locking said stop member in any desired position of adjustment along either of said first, second or third axis whereby the stop member may

be moved to the desired position adjacent the vise and locked in said desired position to permit the removal and replacement



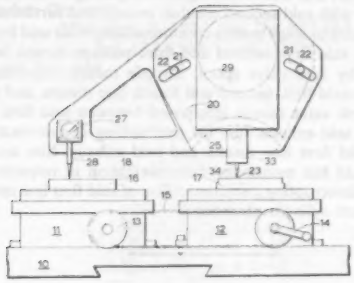
of the workpiece held in the vise thereby precisely locating each workpiece with respect to the machine.

4,020,743

MILLING MACHINES WITH PIVOTAL HEAD

Edward George Feldcamp, Tudor Cottage, Church End, Twyning Tewkesbury, Gloucestershire, England

Filed Dec. 18, 1975, Ser. No. 641,938
Int. Cl.² B23C *1/16, 1/12*
U.S. Cl. 90—13.3 **5 Claims**



1. A milling machine comprising a milling head with a downwardly projecting milling cutter, a table on which a workpiece is mounted, said table being movable beneath the milling cutter, and mounting means for the milling head comprising a two-part framework, one of the two parts carrying the milling head and being bolted to the other in adjustable angular relation about a horizontal axis, the parts having constraining mutual engagement such that said horizontal axis lies below the milling head and intersects the axis of the milling cutter at the cutting location.

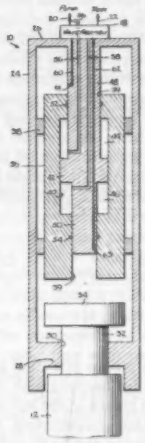
4,020,744

CONTROL OF HYDRAULICALLY POWERED EQUIPMENT

William J. Swenson, Houston, Tex., assignor to Raymond International Inc., Houston, Tex.

Filed Nov. 13, 1974, Ser. No. 523,502
Int. Cl.² F01B *15/00, 7/18;* **F01L** *25/06*
U.S. Cl. 91—216 B **4 Claims**

1. A hydraulically powered hammer with adjustable delay hydraulic switching, said hammer comprising a ram, means guiding said ram for reciprocal movement along a given path and against an anvil, hydraulic piston and cylinder means connected to move said ram, a hydraulic switching valve connected to control operation of said piston and cylinder means and including a housing, a valve spool mounted for reciprocal movement along a bore within said housing, said housing being formed with passageways for a fluid which follows different paths for different positions of said valve spool, a pilot pressure line extending from a position on said hammer to an end of said valve spool to accumulate flows of pressure fluid when said ram reaches predetermined positions for supplying pressurized hydraulic fluid to produce movement of said valve spool, said valve including feedback means to hold same in each switched position until an actuation force is applied to said valve, fluid accumulation means comprising a chamber



connected to said pilot pressure line to receive said flow of fluid, and means including a piston moveable in said fluid accumulation chamber between a first position defining an initial minimum chamber volume and a second position defining a final maximum chamber volume and responsive to the accumulation of a predetermined volume of fluid in said accumulation means for applying an actuating force to said valve, means for adjusting the duration between initiation of said fluid flow and said accumulation of a predetermined volume of fluid, and means biasing said last mentioned piston toward said first position.

4,020,745

POWER SLIDE MECHANISM

Katsuhiko Iijima, and Katsumasa Jomen, both of Sagamihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

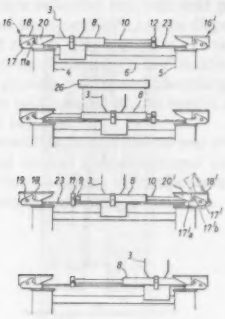
Filed Oct. 9, 1975, Ser. No. 621,232
Claims priority, application Japan, Nov. 5, 1974, 49-126532
Int. Cl.² F01B *15/02*
U.S. Cl. 91—217 **4 Claims**

1. A power slide mechanism, comprising:
an elongated, generally horizontal frame having a left end and a right end;
latch means provided at each end of the elongated frame;
an equipment mounting frame mounted on the elongated frame for movement generally horizontally therealong parallel to the sense of elongation of the frame from adjacent one end to adjacent the other end of the elongated frame;
a hydraulic cylinder having a piston slidably received therein and a piston rod extending from each end of the hydraulic cylinder, the aggregate length of the piston and two piston rods being less than the distance between the two latch means on the elongated frame;
means fixing the hydraulic cylinder, generally horizontally on the equipment mounting frame parallel to the sense of elongation of the elongated frame, so that one piston rod

thereof extends leftwards and the other extends rightwards;

cooperating latch means provided at the outer ends of the two piston rods, for latching with and unlatching from the respective latch means at the left and right ends of the elongated frame;

means for selectively applying hydraulic pressure to either side of the piston to relatively extend one piston rod and correspondingly retract the other piston rod, and vice versa; and



the cooperating latch means provided at the outer ends of the two piston rods for latching with and unlatching from the respective latch means at the left and right ends of the elongated frame thus constituting a left frame latch paired with a left piston rod latch and a right frame latch paired with a right piston rod latch;

one latch of each pair comprising a normally closed catch including a pivotally mounted portion pivotable for opening the catch toward the other latch of the same pair; and

the other latch of each pair comprising pin means retainable in the normally closed catch of said one latch of the respective pair.

4,020,746

HYDRAULICALLY OPERABLE LINEAR MOTOR

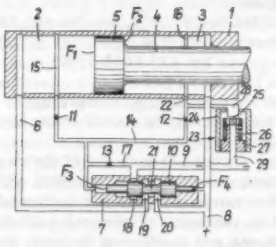
Friedrich Karl Arndt, Essen, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Dec. 3, 1975, Ser. No. 637,465

Claims priority, application Germany, Dec. 14, 1974, 2459210

Int. Cl.² F01L *25/04;* **F01B** *7/18*

U.S. Cl. 91—291 **2 Claims**



1. A hydraulically operable linear motor, which includes in combination: a cylinder having first and second end walls respectively arranged at opposite ends of said cylinder, a double-acting piston reciprocally mounted in said cylinder a piston rod extending through said first end wall and being connected to that side of said piston which faces said first end wall so as to form on said one side an annular piston surface, said annular piston surface forming with said first cylinder end wall a first cylinder chamber, first conduit means leading into said first cylinder chamber for continuously conveying fluid pressure onto said annular piston surface when said first conduit means is connected to a source of fluid pressure, that side of said piston which is opposite said annular piston surface forming with said second cylinder end wall a second cylinder chamber, second conduit means leading into said second cylinder chamber, control valve means interposed between said first and said second conduit means, an exhaust line communicating with said control valve means, said control valve means being movable to a first position to connect said second conduit means to said first conduit means, and also being movable to a second position to connect said second conduit means to said exhaust line, said control valve means including a valve spool with first surface means for continuous communication with said first conduit means, said first surface means being fluid pressure operable to move said control valve means into said second position, said valve spool also having second fluid operable surface means for moving said control valve means to said first position, a fluid conveying control conduit system having first line means and second line means respectively leading into said first and second cylinder chambers at two points respectively located between said first and second cylinder end walls on one hand and said piston in its central position between its end positions on the other hand, said control conduit system also including third line means communicating with said second fluid operable surface means and also including fourth line means communicating with said exhaust line, said control valve means furthermore including first passage means communicating with said first conduit means and also including second passage means communicating with said second conduit means, and furthermore including third passage means communicating with said fourth line means, said first, second and third passage means being controlled by said valve spool, throttle means respectively arranged in said first, second and fourth line means, and preloaded check valve means interposed between said first line means and said exhaust line for establishing communication between said first line means and said exhaust line and to interrupt said last mentioned communication in response to said piston interrupting communication of said first line means with said first cylinder chamber.

4,020,747

HYDRAULICALLY-OPERATED DEVICES

Lionel Arthur Reynolds, Stroud, England, assignor to A. F. Hydraulics Limited, Gloucester, England

Filed Nov. 27, 1974, Ser. No. 527,769

Claims priority, application United Kingdom, Dec. 1, 1973, 55794/73

Int. Cl.² F01L *25/06;* **F01B** *7/18, 11/02*

U.S. Cl. 91—298 **11 Claims**

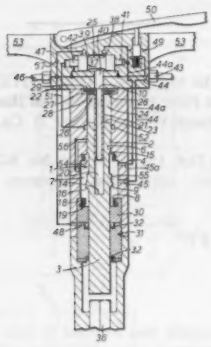
1. A hydraulically operated reciprocatory device comprising:

a body,

reciprocatory piston means within said body, said piston means having an enlarged area portion and said body containing a chamber with a dashpot cavity entered by said enlarged area portion of said piston, said chamber having inlet and outlet ports with said inlet port being adapted to be connected to a source of hydraulic fluid under a continuous, unidirectional pressure to damp overtravel of the piston means at the end of a working stroke thereof and to drive said piston in a return stroke, and

valve means connected to said outlet port of said chamber for receiving said hydraulic fluid under said continuous unidirectional pressure, said valve means controlling the flow of said hydraulic fluid to drive the piston means in said working stroke and controlling the exhaust of said hydraulic fluid from said device, wherein during operation of the device, said hydraulic fluid flows continually

from said inlet port, through said chamber, through said outlet port and through said valve means to thereby re-



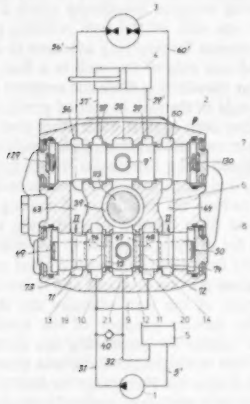
move heat generated as the result of the dashpot action in said dashpot cavity.

4,020,748

VALVE STRUCTURE FOR HYDRAULIC CONTROL SYSTEM

Armin Lang, Schwabisch-Gmund, Bettingen, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Sept. 3, 1974, Ser. No. 502,663
Int. Cl.² F15B *11/08, 13/04*
U.S. Cl. 91—449 **6 Claims**



1. In a hydraulic control system including a source of hydraulic fluid with a high-pressure side and a low-pressure side, a valve cylinder with a plurality of inner peripheral grooves generally symmetrically disposed about a plane transverse to the cylinder axis and including a central groove, two intermediate grooves and two outer grooves, a valve piston slidable in said cylinder and provided with a plurality of piston heads including a middle head generally symmetrically flanked by two lateral heads which are axially separated from said middle head by a pair of annular recesses, a hydraulic servomotor, two branch conduits respectively communicating with said outer grooves and said servomotor, a common return conduit communicating with said central groove, said intermediate grooves communicating with said high-pressure side and said central groove communicating with said low-pressure side, said annular recesses interconnecting said central and intermediate grooves in a normal piston position whereby hydraulic fluid constantly recirculates from said high-pressure side to said low-pressure side, said piston being axially shiftable from said normal position to cut off both said intermediate grooves from said central groove and to connect one intermediate groove to the adjoining outer groove for pressurizing the corresponding branch conduit, said annular recesses communicating in said normal position with said intermediate grooves by a pair of first passages and with said central groove by a pair of second passages, said lateral heads having a pair of first annular lands facing said plane and defining said first passages with confronting first annular cylinder edges, said middle head having a pair of second annular lands averted from said plane and defining said second passages with confronting second annular cylinder edges, said conduits being provided with ancillary valve means for connecting said servomotor between said return conduit and the pressurized branch conduit in an off-normal piston position, and control means for jointly displacing said piston and said ancillary valve means,

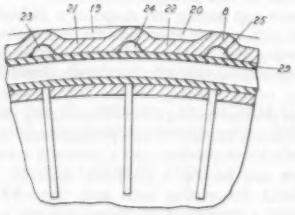
the improvement wherein the axial separation of said first lands from said first confronting edges substantially exceeds the axial separation of said second lands from said second confronting edges in said normal position, said middle head having peripheral areas adjacent said second lands radially spaced from a pair of adjoining inner cylinder surfaces by narrow clearances maintaining a restricted fluid flow through one of said second passages on one side of said plane upon a shifting of said piston to said one side into an off-normal position of zero axial separation between the corresponding first land and first confronting edge coinciding with incipient communication between said intermediate and outer grooves on the other side of said plane via metering means between said corresponding first land and first confronting edge, the other of said first passages on said other side closing only upon a further piston shift beyond said position of zero axial separation, said radially spaced areas being of sufficient axial width to maintain said restricted fluid flow through either of said second passages beyond the position of closure of the respectively opposite first passage.

4,020,749

BRAKE BOOSTER

Ewald Müller, Neu-Isenburg, and Reimund Becht, Frankfurt-Hochst, both of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Continuation of Ser. No. 583,825, June 4, 1975, abandoned. This application Aug. 2, 1976, Ser. No. 710,981
Claims priority, application Germany, Sept. 4, 1974, 2442339
Int. Cl.² F01B *19/00*
U.S. Cl. 92—48 **10 Claims**



1. A brake booster comprising:

a housing having a longitudinal axis;

a partition disposed transverse of said axis to divide said housing into two chambers;

a first booster piston disposed adjacent one end of said housing, transverse of said axis and in one of said two chambers to form a first working chamber of variable

pressure remote from said partition and a first vacuum chamber of constant pressure adjacent said partition;

a second booster piston disposed adjacent the other end of said housing, transverse of said axis and in the other of said two chambers to form a second working chamber of variable pressure adjacent said partition and a second vacuum chamber of constant pressure remote from said partition; and

a plurality of elongated spaced crosspieces formed in said housing disposed parallel to said axis about the periphery of said housing, said plurality of cross-pieces being formed by spaced inward indenting of said housing and said adjacent ones of said plurality of crosspieces forming a plurality of elongated spaced channels therebetween parallel to said axis to enable communication between said first and second vacuum chambers.

4,020,750

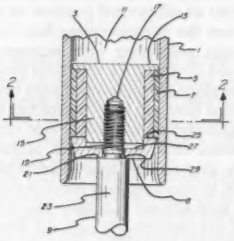
PISTON PUMP MECHANISM

Gerhart William Freimuth, Flemington, and Jerold Samuel Weiner, Spotswood, both of N.J., assignors to Gerhart Engineering and Machine Co., Somerville, N.J.

Filed Nov. 3, 1975, Ser. No. 628,348

Int. Cl.² F16J 1/06

U.S. Cl. 92—205 **9 Claims**



1. A piston pump mechanism comprising:

a cylindrical sleeve member having an interior wall:

a plunger head, slideably mounted within said sleeve, of a rigid material having an upper portion forming a shoulder, a reduced lower portion of said plunger head being concentric with said upper portion, a transverse face of said lower portion having a centrally located threaded hole;

a first ring of resilient material mounted only around a major portion of said lower portion of and having one end abutted against said shoulder of said plunger head;

a second ring of resilient material mounted only around said first ring and slightly less in width than said first ring of resilient material, and having one end abutted against said shoulder of said plunger head;

a pressure cap having the shape of a dished annulus provided with a peripheral rim, the radial thickness of said rim being about the combined thickness of said first and second rings as joined, substantially preventing cold flow, if any, of the material of said first and second rings, the dished portion having a diameter slightly greater than that of the lower portion of said plunger head slideably engaging this lower portion, and a centrally located hole; and

a piston rod having a stub-like reduced end which is threaded for mating with said threaded hole of said plunger, a shoulder being formed at the junction of said reduced end and the unreduced portion of said piston rod, said reduced end being inserted through the hole of said pressure cap, a portion of said pressure cap resting upon said shoulder, whereby said cap is oriented so that as said rod is screwed into said plunger head, the top of said peripheral rim of the cap increasingly applies an axial force against the other end of said first ring, resulting in said first ring applying an increasing radial force against said second ring, and said rod is screwed into said plunger to the point at which said second ring seals against the interior wall of said sleeve.

4,020,751

APPARATUS FOR MAKING COMPOSITE FILTER PLUGS

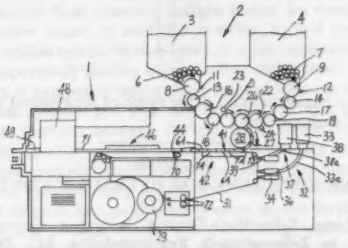
Heinz Greve, and Peter Grumer, both of Hamburg, Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Oct. 15, 1975, Ser. No. 622,757

Claims priority, application Germany, Nov. 7, 1974, 2452749

Int. Cl.² A24C 5/50

U.S. Cl. 93—77 FT **11 Claims**



1. In an apparatus for making composite filter plugs wherein a tubular wrapper surrounds several types of filter material, a combination comprising means for advancing a continuous web of wrapping material lengthwise along a predetermined path wherein one side of the web remains exposed; a first paster having means for applying adhesive to an intermediate portion of said one side of the web in a first portion of said path; means for transferring filter rod sections of several types onto said one side of the web in second portion of said path so that the sections abut against each other end-to-end and adhere to said intermediate portion of said one side of the web to form an elongated filler; first sealer means for promoting the setting of adhesive in the region of said second portion of said path so as to reduce the likelihood of shifting of the abutting sections of said filler relative to said web; a second paster having means for applying adhesive to one marginal portion of the web; means for draping the web around said filler so that said one marginal portion contacts and is bonded to the other marginal portion of the web whereby the thus draped web constitutes the tubular wrapper of the resulting filter rod; second sealer means for promoting the setting of adhesive which bonds said marginal portions; and means for subdividing said rod into discrete filter plugs each of which contains at least a portion of a section of each of said several types.

4,020,752

AIR DIFFUSER WITH MODULAR CORE

Karl Heinz Stephan, Tucson, Ariz., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Oct. 10, 1975, Ser. No. 621,570

Int. Cl.² F24F 13/16

U.S. Cl. 98—40 D **7 Claims**

1. Apparatus for diffusing the air flow from an air distribution duct, said apparatus comprising, in combination:

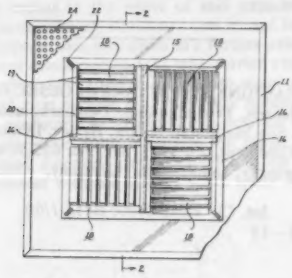
a. a rectangular framework connectable to the outlet of the air distribution duct;

b. a plurality of support strips for dividing said framework into a plurality of modular rectangular openings;

c. a plurality of modular rectangular core elements for insertion into the openings, each of said elements being insertable into the openings in a plurality of orientations

and being supported by at least one of said support strips upon being inserted into the openings; and

d. a plurality of securing means each positioned at a corner



of a different one of each of said elements opposite the supporting strip supporting said element, each securing means engaging said element and releasably supporting a corner of said element.

4,020,753

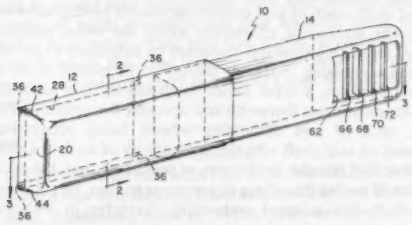
VENTILATION EXTENSION UNIT

Ernest Efstratis, 6775 Wing Lake Road, Birmingham, Mich. 48010

Filed Oct. 6, 1975, Ser. No. 619,618

Int. Cl.² F24F *13/06*

U.S. Cl. 98—40 C **1 Claim**



1. A portable air duct extension especially for a building heated or cooled by air and having a hot or cold air register, said air duct extension comprising an elongated tubular member composed of sections longitudinally slidably telescoped together so as to permit said tubular member to be adjusted as to length, the telescoping ends of said sections being open and in unobstructed airflow communication with one another, an inlet opening in the rear wall of one of said sections and an outlet opening in the front wall of the other of said sections, the rear wall of said other section having a portion behind said outlet opening which is inclined toward said outlet opening in a direction away from said inlet opening to provide a gradually narrowing air discharge chamber, means for removably mounting said tubular number so that its inlet opening overlies the register to receive air from the latter and discharge the same through said outlet opening, and a plurality of at least three baffles controlling the discharge of air from said outlet opening, said baffles extending across said outlet opening in spaced apart relation longitudially of said tubular member and projecting into said air discharge chamber, all of said baffles except the second baffle from said inlet opening projecting into said air discharge chamber the same distance and said second baffle projecting farther thereinto.

4,020,754

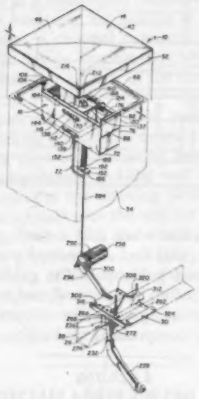
CAP-TYPE FLUE DAMPER

Bernard L. Dalsin, Edina; George J. Dalsin, and Lawrence T. Schwaab, both of Minneapolis, all of Minn., assignors to Bernard L. Dalsin Co., Minneapolis, Minn.

Filed June 4, 1975, Ser. No. 583,841

Int. Cl.² F23L *17/10*

U.S. Cl. 98—59 **10 Claims**



1. A flue damper assembly comprising;

a. mounting means adjustably positionable across a flue opening;

b. a downwardly extending lifting element arranged for sliding vertical movement;

c. closure cap means of a size sufficient to cover said flue opening, said closure cap means being mounting on the upper end of said lifting element;

d. biasing means operatively associated with said lifting element and normally urging said closure cap means into an open position;

e. hearth located control means operatively connected to said biasing means for remotely controlling the position of said closure cap means relative to said flue opening, said control means including cable means operatively attached at one end to said biasing means and at the other end to spool means, said spool means being rotatably mounted on a handle means having a hand graspable section, restraining means releasably engageable with said spool means for controlling the direction of rotation of said spool means, and positioning means providing a plurality of preselected positions for said handle means corresponding to positions of said closure cap relative to said flue opening.

4,020,755

PRESS BINDING MACHINE

Sven Arne Böhlmark, Sundsvall, Sweden, assignor to Sunds Aktiebolag, Sundsvall, Sweden

Filed Jan. 26, 1976, Ser. No. 652,404

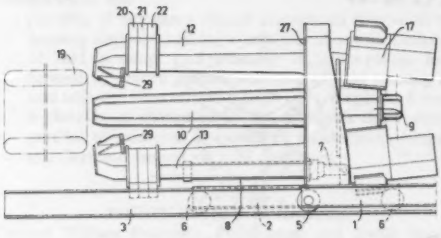
Claims priority, application Sweden, Feb. 10, 1975, 7501459

Int. Cl.² B65B *13/04*

U.S. Cl. 100—12 **9 Claims**

1. A machine for compressing and wrapping a coil of material, comprising a press for compressing the coil including first press means and second press means movable relative to each other, said first press means including wrapping means for wrapping the compressed coil with a binding member, said first press means including a mandrel substantially horizontally disposed for receiving said coil and at least two press arms concentrically arranged about said mandrel and means for moving said press arms with respect to said mandrel for

enclosing said coil; each of said press arms includes pressing surfaces, first guide bars for guiding the binding member, and means for joining the ends of said binding member about said coil; said mandrel including second guide bars for guiding the binding member, means for moving said second guide bars relative to said mandrel to move between a first position and



a second position so that when said second guide bars are in said second position, said first and second guide bars cooperated to form a closed guide path for guiding and binding member about said coil to be wrapped, and said second press means includes a pressing plate for cooperating with said pressing surfaces for compressing said coil.

4,020,756

BAND CLAMPING DEVICE FOR A MACHINE WRAPPING A BAND, STRIP OR THE LIKE ABOUT PIECE GOODS OR THE LIKE

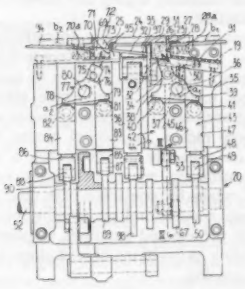
Max Weiss, Jestetten, Switzerland, assignor to Strapex AG, Hergiswil, Switzerland

Filed Dec. 12, 1975, Ser. No. 640,242

Claims priority, application Switzerland, Dec. 20, 1974, 17004/74

Int. Cl.² B65B *13/24*

U.S. Cl. 100—26 **11 Claims**



1. A band clamping device for a machine for strapping articles by means of a band, especially a plastic band, comprising a stationary clamp jaw, a movable clamp jaw, means for guiding the movable clamp jaw for movement in a predetermined displacement direction towards and away from the stationary clamp jaw, a toggle lever having a first element and a second element, means defining a first movable end hinge of the first element for hingedly connecting the movable clamp jaw at the first element, means defining an intermediate hinge for hingedly connecting the first element with the second element, means defining a second end hinge for hingedly supporting said second element, drive means for pivoting said second element about said second end hinge, both of said clamp jaws possessing essentially flat clamping surfaces for engagement with the band and for fixedly holding the band against traction forces, essentially acting in the direction of a plane containing said clamping surfaces, the connection line between the hinge center points of the end hinges of the toggle lever together with the clamping surfaces of the clamp jaws enclosing an acute angle which opens in the direction of the traction force, said means for guiding the movable clamp jaw being structured to be elastically resilient in said direction of the traction force.

4,020,757

MACHINE FOR MARKING OBJECTS

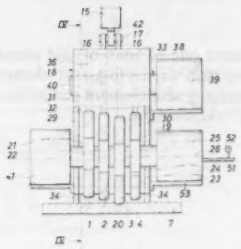
Hans Christensen, Frederikssund, Denmark, assignor to H. Nielsen & Son Maskinfabrik A/S, Herlev, Denmark

Filed Sept. 23, 1975, Ser. No. 615,969

Claims priority, application Germany, Oct. 1, 1974, 2446904

Int. Cl.² B44B *5/00;* **B41J** *1/60*

U.S. Cl. 101—18 **13 Claims**



1. An object marking machine comprising a frame, a raisable and lowerable holding cylinder suspended from said frame, an embossing head mounted beneath and connected to said holding cylinder for movement therewith, an embossing wheel shaft rotatably mounted on said embossing head, a plurality of embossing wheels mounted in side-by-side relation on said shaft, each of said embossing wheels having outwardly projecting embossing characters along the outer periphery thereof and being rotatably mounted on said shaft to permit a selected embossing character thereof to be placed in an embossing position, a drive motor mounted on said embossing head for movement therewith and operable for rotation of said shaft, each of said embossing wheels being eccentrically mounted on said shaft with the eccentricity of each in a different direction relative to the axis of said shaft than the eccentricities of any of the others in a manner so that, on rotation of said shaft, the selected embossing character in embossing position of one of said embossing wheels is positioned at a locus of maximum eccentricity from the axis of said shaft and closer to the object to be marked than the selected embossing character in embossing position of any of the other of said embossing wheels, whereby the selected embossing characters in embossing position of said embossing wheels may be individually and sequentially pressed into engagement with the object to be marked, one at a time, on rotation of said shaft by said drive motor.

4,020,758

TYPE CARRIER ARRANGEMENT FOR ROLLER PRINTING

Gottfried Bürkhardt, Winkelhaid, Germany, assignor to Diehl datensysteme G.m.b.H, Nurnberg, Germany

Filed Feb. 24, 1975, Ser. No. 552,040

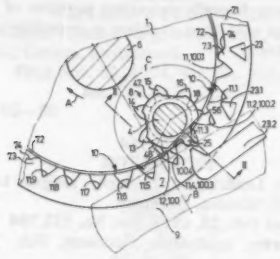
Claims priority, application Germany, Feb. 25, 1974, 2408927

Int. Cl.² B41J *1/34*

U.S. Cl. 101—110 **4 Claims**

1. A printing device comprising; in combination a rotary type drum, at least one type carrier rotatable with the drum and rotatable on the drum, multiple circumferentially spaced type sections thereon each adapted in a respective rotated

position of one type carrier to carry out a printing operation in one rotated position of the drum, an arcuate stationary gear segment concentric with the drum in a plane spaced axially from the plane of the type sections, a gear connected to said type carrier means in the plane of said gear segment and having one tooth missing, stationary cam means having a cam surface concentric with said drum in a further axial plane and a cam element connected to said type carrier axially aligned with the leading side of the missing tooth space of said gear engaging said cam surface and positively holding said type carrier in a predetermined rotated idle position on the type drum when the type drum is outside the range of said one rotated position, a control tooth connected to the type carrier in axial alignment with the missing tooth space and in a still



further axial plane, circumferentially spaced pawls including a pawl for each type section on the type carrier adjacent the path of said control tooth selectively engageable therewith to rotate said type carrier on the type drum to cause the gear connected therewith to mesh with said gear segment and be rotated thereby during rotation of said drum, said stationary cam means having a cam element receiving space therein for each pawl to permit rotation of said gear when the respective pawl is moved into engagement with said control tooth, the number of tooth spaces in said gear segment being equal to what is required to rotate said type carrier to the idle position thereof when the type carrier has rotated the minimum amount on said type drum to present a type section to printing position.

4,020,759

METHOD AND APPARATUS FOR MARKING A WEB

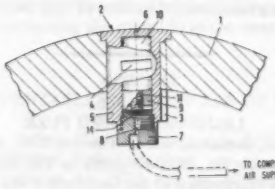
Eeuwoud van den Heuvel, Helmond, and Huibert Peter Reinhold, Eindhoven, both of Netherlands, assignors to Visco B.V., Netherlands

Filed Mar. 31, 1975, Ser. No. 563,451

Claims priority, application Netherlands, Apr. 18, 1974, 7405267

Int. Cl.² B41F *31/08*

U.S. Cl. 101—328 **9 Claims**



1. Apparatus for applying viscous liquid marking substance to a moving web at spaced-apart locations comprising: a roller; at least one removable hollow cylindrical storage container in the roller, said container having one end exposed at the surface of the roller and conforming with the outer circumferential configuration of said roller, said container being provided with a narrow unobstructed channel extending between the interior of said container and an open mouth located on the end of said container exposed at the surface of the roller; a piston slidably mounted in said container forming a chamber for the marking substance between said piston and said one end of the container; and pressure means for closing the other end of said container and for applying pressure to the liquid marking substance within the interior of said container.

7. A method of applying a viscous liquid marking substance to a moving web at spaced-apart locations by using a marking device having a reservoir for holding a supply of a viscous marking substance, a channel connecting the reservoir with the exterior of the device wherein the channel is provided with a mouth at the exterior surface of the device and a source of pressure for pressurizing the viscous marking substance retained in the reservoir said method comprising the steps of bringing the marking device into contact with the web; rotating the marking device by creating relative movement between the marking device and the web so that during each complete revolution of the marking device the mouth of the channel is out of contact with the web for a first period of time and in engaging contact with the web for a second period of time; forming a predetermined quantity of viscous marking substance exteriorly of the mouth during the first period of time; and subsequently applying the entire quantity of the marking substance formed exteriorly of the mouth to the web during the second period of time.

4,020,760

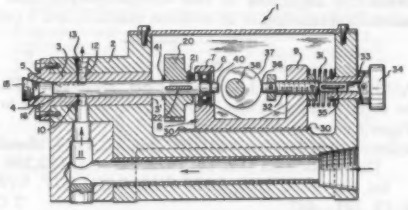
PRINTING INK METERING PUMP

Jack Bryer, Paramus, N.J., assignor to Wood Industries, Inc., Middlesex, N.J.

Filed Dec. 15, 1975, Ser. No. 640,840

Int. Cl.² B41F *3/08*; **F04B** *7/06, 37/10*

U.S. Cl. 101—366 **3 Claims**



1. A variable stroke positive displacement liquid pump unit for metering a precise amount of printing ink for use with a printing press, said pump unit comprising a cylindrical pump casing, an inlet port and an outlet port in the sides of said casing, a rotatably and reciprocally moveable cylindrical plunger extending into said casing through one axial end thereof with said plunger having an axially extending flat portion adapted to overlie said inlet port and said outlet port during different degrees of rotation of said plunger and during different amounts of stroke of the plunger and having the cylindrical plunger extend over said inlet and outlet port when said plunger is completely extended into said casing, means for rotating said plunger whereby the flat portion extends over said inlet port during a portion of the axial movement of said plunger out of said casing and over said outlet port during a portion of the axial movement of said plunger into said casing, a slidable yoke rotatably supporting one end of said plunger, a rotatable cam shaft having a cam rise thereon, a rotatable screw threaded in said yoke on the opposite side of said cam shaft from said plunger and adapted to engage said cam rise when said plunger is moved out of said pumping chamber, spring means urging said screw toward said cam rise and said plunger into said casing, and adjustment means for rotating said screw to vary its position with respect to said one end of said plunger whereby the amount of movement of said yoke

and plunger in a direction away from said pumping chamber may be varied.

4,020,761

PLANOGRAPHIC DRY OFFSET MASTER PLATE

Makoto Ogiwara; Kenichi Tanaka; Yukio Kojima; Kohichi Nakamura, all of Shizuoka; Yuji Harazaki, Tokyo; Minoru Takamizawa, Annaka; Yoshio Inoue, Annaka, and Toshikazu Sugita, Annaka, all of Japan, assignors to Tomoegawa Paper Co., Ltd. and Shin-Etsu Chemical Industry Co., Ltd., Tokyo, Japan

Filed Dec. 24, 1975, Ser. No. 644,019

Claims priority, application Japan, Dec. 24, 1974, 49-1706

Int. Cl.² B41N *1/12*; B32B *9/04*

U.S. Cl. 101—457 19 Claims

1. A planographic dry offset master plate which is composed of a substrate which has adhesiveness to and does not absorb or imbibe the silicone material and formed continuously thereon a cured layer of silicone rubber comprising a diorganopolysiloxane having a viscosity of at least about 100,000 centistokes at 25° C, in which from 5 to 40 mole% of the organic groups directly bonded to the silicon atoms are phenyl groups, a cross-linking agent having at least two functional groups in its molecule capable of forming cross-linkages between the molecules of said diorganopolysiloxane by a condensation reaction or an addition reaction, and a catalyst.

9. A planographic dry offset master plate for an electrostatic process and a direct image process which is composed of a substrate which has adhesiveness to and does not absorb or imbibe the the silicone material, and formed continuously thereon a cured layer of a silicone rubber comprising a diorganopolysiloxane having a viscosity of at least about 100,000 centistokes at 25° C, in which from 10 to 30 mole% of the organic groups directly bonded to the silicon atoms are phenyl groups, and a cross-linking agent having at least two functional groups in its molecule capable of forming cross-linkages between the molecules of said diorganopolysiloxane by a condensation reaction or an addition reaction, and a catalyst.

4,020,762

LASER IMAGING A LANOGRAPHIC PRINTING PLATE

John O. H. Peterson, Cape Elizabeth, Maine, assignor to Scott Paper Company, Philadelphia, Pa.

Continuation of Ser. No. 434,257, Jan. 17, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,356

Int. Cl.² B41C *1/10*; G03F *7/10*; G03C *5/17*, *5/18*

U.S. Cl. 101—467 2 Claims

1. The method of making an imaged printing plate comprising the steps of:

a. providing a planographic printing plate which comprises, on a substrate, a layer which contains an organic-solvent-soluble negative working diazo compound, carbon particles and a self-oxidating binder;

b. selectively removing areas of said layer by means of a laser beam so as to define on the plate an image which is sensitive to ultraviolet light;

c. exposing the plate overall to ultraviolet light; and

d. developing the plate to cause the image areas struck by laser beam to accept ink and the non-image areas to accept water.

4,020,763

CARTRIDGE CONSTRUCTION

Antonio Iruretagoyena, Calle Adriano VI,18, Vitoria, Spain

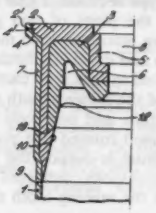
Filed Nov. 5, 1975, Ser. No. 629,122

Claims priority, application Spain, Apr. 29, 1975, 211994

Int. Cl.² F42B *7/06*

U.S. Cl. 102—44 7 Claims

1. Improved cartridge without metallic reinforcement portions comprising an exterior or case, an internal or base member and an intermediate bushing member all of which are of plastic material, said bushing member being disposed between said case and said base by injection and closely joining said case and said base to provide an assembly forming a monobloc body provided with central orifice for a primer, said bushing member having laterallly extending portions extending exter-



nally of and over laterally extending portions of said base member so that said base member is completely enclosed within said cartridge.

4,020,764

DETONATOR

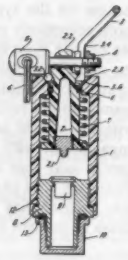
Paul Beermann, Lendringsen, Germany, assignor to Hagenuk & Co. GmbH, Menden, Germany

Filed Feb. 25, 1975, Ser. No. 552,784

Claims priority, application Germany, Feb. 26, 1974, 7406695[U]

Int. Cl.² F42C *15/00*

U.S. Cl. 102—70 S 10 Claims



1. A detonator, comprising a housing; a firing cap in said housing; a firing pin movable lengthwise in said housing and having a free end adapted to impact said firing cap; biasing means permanently biasing said firing pin towards said firing cap; and firing-pin retaining means for retaining said firing pin against yielding to the biasing force of said biasing means, comprising a spring-wire clip having a circumferentially incomplete retaining portion received in an annular channel composed to two registering annular grooves formed in an outer circumferential surface of said firing pin and a juxtaposed inner circumferential surface of said housing.

4,020,765

LIGHT ACTIVATED FUZE

Coy M. Glass, deceased, late of Towson, Md., and James G. Dante, Churchville, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

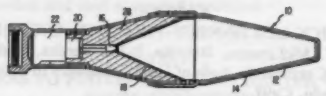
Filed Nov. 7, 1975, Ser. No. 629,818

Int. Cl.² F42C *11/00*, *1/00*, *13/02*, *11/02*

U.S. Cl. 102—70.2 R 14 Claims

1. In a warhead assembly having an explosive and a detonator for activating said explosive, a fuze comprising a triboluminescent material coated on the interior portion of said assembly, a photo-sensitive detector for detecting the light caused

by said triboluminescent material upon impact of said warhead assembly, and means responsive to said photo-sensitive



detector and communicating with said detonator so as to cause the detonator to activate and detonate the explosive.

4,020,766

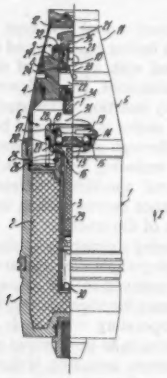
EXPLOSIVE PROJECTILE

Bernard Moyse, Chene-Bourg, Switzerland, assignor to Sarmac S.A., Geneva, Switzerland

Filed Nov. 20, 1974, Ser. No. 525,662

Int. Cl.² F42C *15/26*

U.S. Cl. 102—80 **41 Claims**



1. Explosive projectile comprising an explosive charge and a device for firing a detonator outside of the charge, in which the explosive charge comprises a recess, the projectile comprises a device for priming this explosive charge comprising an explosive relay housed at all times at least partially in the recess in the explosive charge and mounted to slide therein between a retracted safety positon in the explosive charge for which the relay is kept remote from the detonator and a forward armed position in which this relay is situated in the immediate proximity of the detonator or is in contact therewith, while being partially engaged in the explosive mass, and a device for locking the explosive relay in its retracted safety position, characterised in that the device for locking the relay comprises an occluding device (13) placed in front of the front end of the relay (3) and means for locking this occluding means and maintaining the relay (3) in the unarmed position.

4,020,767

DISPLAY TURNTABLE FOR VEHICLES OF DIFFERENT WHEEL BASES

David Hardy, Bolton, England, assignor to British Turntable Company, Limited, Bolton, England

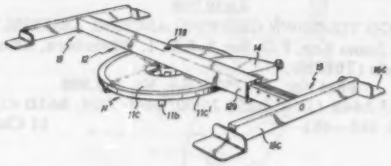
Filed Apr. 21, 1975, Ser. No. 570,030

Claims priority, application United Kingdom, Apr. 26, 1974, 18355/74

Int. Cl.² B60S *13/02*

U.S. Cl. 104—35 **9 Claims**

1. In a vehicle display turntable including a cradle having an elongated element slidably mounted in telescoping relationship with the elongated element of a rotatable support unit, and a plurality of wheel pad structures each having an arm member telescopingly engaged with the transverse element of a respective cradle, first guide means between and independently guiding said elongated elements to facilitate relative movement therebetween, second guide means between and independently guiding said arm members and said transverse



element to facilitate relative movement therebetween, a bearer plate extending transversely between said elongated elements and beneath one of said elongated elements, said bearer plate having transversely spaced support surfaces slidably engaging transversely spaced regions of the bottom surface of said one elongated element.

4,020,768

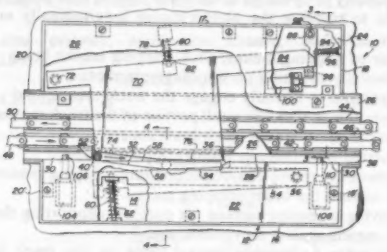
TOW LINE ACCUMULATOR

John Newbegin, Easton, Pa., assignor to SI Handling Systems, Inc., Easton, Pa.

Filed July 21, 1975, Ser. No. 597,935

Int. Cl.² B65G *17/42*

U.S. Cl. 104—172 BT **4 Claims**



1. An accumulator for stopping vehicles having a tow pin which is pushed by a conveyor dog comprising:

a. a housing adapted for installation in a floor, said housing having at least one stationary track therewithin and open at both ends,

b. means defining a top wall for said housing, said top wall having a tow pin slot through which a tow pin may extend for contact with a pusher dog on a conveyor run in said track, said slot having an edge angled with respect to said track and wherein a tow pin is no longer in contact with a pusher dog,

c. first and second control members movably mounted in said housing, each control member having spaced edges for shifting a tow pin which is out of contact with the pusher dog transversely with respect to said track, said spaced edges being at substantially the same elevation below the elevation of said slot for contact with a tow pin extending through the slot, said second member having an angled edge generally parallel to said angled edge of said slot, said second member having a stationary accumulation position wherein said angled edges are arranged for stationary cooperation in shifting a moving tow pin,

d. first means for biasing said first member toward said second member, second means for biasing said second member toward said first member to said accumulation position at all times, and

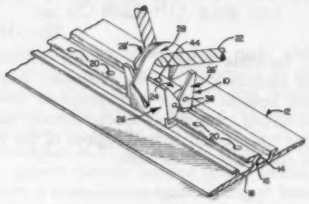
e. latch means operatively associated with said second member for selectively retaining said second member in its stationary accumulation position.

4,020,769

CARGO TIE-DOWN GRIPPING ANCHOR ASSEMBLY

Donald James Keir, P.O. Box 9, R.R. 1, Winterburn, Alberta, Canada (T0E2N0)

Filed Apr. 17, 1975, Ser. No. 568,908
Int. Cl.² A44B *13/00*; B25B *25/00*; B60P *7/08*; B61D *45/00*
U.S. Cl. 105—481 11 Claims



1. In an aircraft cargo tie-down system having elongate track means for flexibility in stowing cargo and tie-down guy means for restraining cargo from shifting, an improved tie-down clamp means for releasably anchoring the guy means to the track means comprising:

locating means having longitudinally extending hinge pin means and a transverse projection received by one of a plurality of openings in the track means, and being operable to position the clamp means longitudinally on the track means;

a pair of gripping means, each gripping means being pivotally mounted on the hinge pin means,

operable to laterally engage the track means, and

operable to underlie a rail portion of the track means; and

a pair of hook means, each hook means

carried by a corresponding gripping means,

extending above the corresponding gripping means and toward the other gripping means,

having a bearing surface for partially supporting the guy means against movement, and

operable to increase lateral force on the track means when tension increases in the guy means.

11. A cargo tie-down anchor comprising:

a circularly cylindrical center body member having

a transverse bore with a circularly cylindrical pin projecting outwardly therefrom for engaging a track, and

a pair of longitudinal bores symmetrically spaced in a diametrical plane perpendicular to the transverse bore and having a hinge pin projecting outwardly from each end;

a pair of members, each member having

a body portion with an upper edge, a lower edge, and two ends,

a pair of ears, each ear connected to a corresponding end of the body portion, extending generally perpendicularly therefrom, and having an opening in which one hinge pin is received to pivotally mount the body portion on the center body member,

a serrated edge portion extending generally perpendicularly from the lower edge of the body portion in the same direction as the ears and spaced from the center body member to receive a track rail therebetween for lateral engagement below the rail portion thereof, and

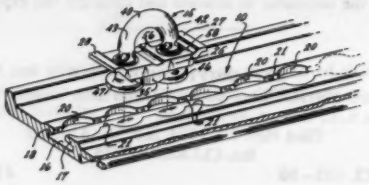
a hook connected to the upper edge of the body portion adjacent the midpoint thereof, generally perpendicularly extending on both sides of the plane of the body portion, extending beyond the upper edge of the body portion toward the other member, having a bearing surface and cooperating with other hook to define a guy-receiving opening in which a guy engages the bearing surface of each hook.

4,020,770

QUICK DISCONNECT TIE-DOWN ANCHOR

Richard E. McLennan, Rancho Palos Verdes, and Robert Looker, Carpinteria, both of Calif., assignors to Satron, Inc., El Segundo, Calif.

Filed July 17, 1975, Ser. No. 596,666
Int. Cl.² A44B *19/00*; B25B *25/00*; B60P *7/08*; B61D *45/00*
U.S. Cl. 105—482 10 Claims



1. A quick disconnect dual stud type track tie-down fitting for use with a track having a groove and spaced upper legs, the legs being provided with a series of slots and lips each of predetermined dimensions, the tiedown fitting being assembled to the track by insertion of the studs thereof through the slots for retention under said lips and being removed by passage of the studs through said slots comprising :

retainer means including space lifting portions and means forming spaced apertures therein whose centers are spaced a distance corresponding to the spacing between adjacent slots of the track,

insert means having a generally U-shaped body and including spaced integral parallel legs arranged in alignment,

said legs being received in said spaced apertures and being spaced a distance for alignment with the slots of the track,

stud means cooperating with each of the legs and each having a dimension to be received in the slots in the track,

said retainer means including locking means located between the legs of said insert and dimensioned to be received in a slot of the track, and

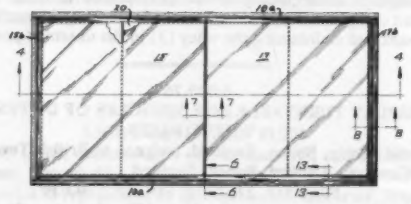
biasing means cooperating with said retainer and said insert for biasing said retainer into a position to effect engagement of said locking means with a slot in the track as said studs are positioned under the lips of the track.

4,020,771

EXTENDIBLE TABLE

James A. Hasenour, 821 Church Ave., Jasper, Ind. 47546

Filed Apr. 15, 1976, Ser. No. 677,428
Int. Cl.² A47B *1/00*
U.S. Cl. 108—86 8 Claims



1. An extendible table comprising a stationary framework having side rails and end rails, first and second end sections mounted on said framework and movable from a non-extended position to an extended position, and a third section concealed beneath said first and second end sections at said non-extended position and movable within the confines of said

side rails to a position between said first and second end sections when the latter are at said extended position, the ends of said third section being concealed by said side rails at said non-extended and said extended positions.

4,020,772

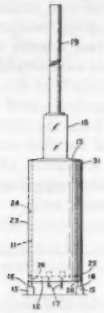
PROCESS TO PROTECT PROCESS HEATER CASING FROM CORROSION

Thomas F. O'Sullivan, Montclair, N.J., and Paul Korwin, Flushing, N.Y., assignors to The Lummus Company, Bloomfield, N.J.

Filed Jan. 22, 1976, Ser. No. 651,366

Int. Cl.² F23L *15/00*

U.S. Cl. 110—56 **5 Claims**



1. A wall for a direct fired heater and comprising in combination:

a metal inner casing with an inner refractory lining,

a metal outer casing spaced from the inner casing to provide an air space therebetween,

the outer casing being provided with an air opening which allows air into the air space; and a plurality of horizontally oriented metal baffles connected to the inner casing and extending outward into the air space, the baffles spaced from the outer casing, where by heat loss due to convection by air current is minimized.

4,020,773

SLUICE FOR CLINKER AND ASHES

Evald Blach, Glostrup, Denmark, assignor to Aktieselskabet Volund, Abildager, Denmark

Filed July 28, 1975, Ser. No. 599,343

Claims priority, application Denmark, July 29, 1974, 4054/74

Int. Cl.² F23J *1/06*

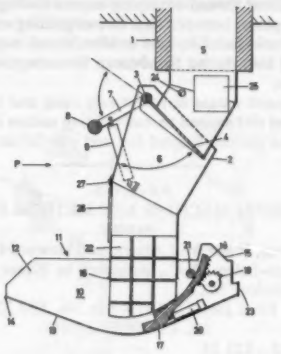
U.S. Cl. 110—165 R **8 Claims**

1. An apparatus for removing burnt material such as clinker, combusted or uncombusted residual material and the like from a combustion furnace having means communicating with the furnace for discharging said material which comprises:

a. a duct attached to the furnace discharge means, said duct defining an internal sluice chamber oriented in a generally downward direction relative to a horizontal plane and having an upper material inlet end portion and a lower discharge end portion;

b. a flap rotatably mounted with respect to said duct and positioned in such manner as to divide said duct into an upper chamber positioned to receive material from the combustion furnace and a lower chamber positioned to receive material from said upper chamber, said lower chamber defining a discharge opening;

c. means positioned below said lower chamber and configured and adapted to receive material passing from the upper end portion of the duct to the lower end portion of the duct and to accumulate such material in such manner as to obstruct the opening thereof to thereby form a substantially tight closure seal of said discharge opening of said lower end portion of the duct; and



d. means for selectively displacing at least a portion of the accumulated material to a location directed away from the lower end portion of the duct and in a manner to maintain said closure seal of said duct discharge opening.

4,020,774

APPARATUS FOR MAKING LOOP PILE FABRIC

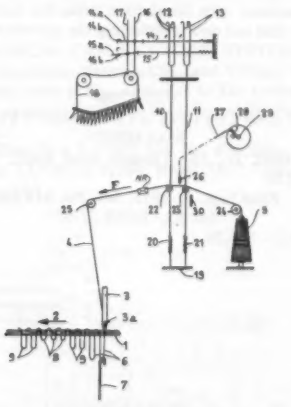
Paul Sage, Lyon, France, assignor to Verdol S.A., Lyon, France

Filed June 20, 1975, Ser. No. 588,994

Claims priority, application France, June 20, 1974, 74.22549

Int. Cl.² D05C *15/32*

U.S. Cl. 112—79 A **6 Claims**



1. In a tufting machine having loop-forming needles, a device to selectively feed to each one of said needles a variable length of thread to realize a pile fabric formed of loops of different height in accordance with a predetermined pattern, comprising:

a thread supply from which thread may be drawn;

a first and a second thread guiding means on which the thread from said supply passes in succession before reaching said one of said needles, said first and second thread-guiding means being spaced from each other in the horizontal direction and including means for vertically displacing the same independently from each other;

a substantially horizontal thread-lowering beater bar vertically reciprocatable between said first and second thread-

guiding means to lower the portion of said thread comprised between same;

means to reciprocate said beater bar in unison with the operation of said tufting machine;

unidirectional thread clamping means through which said thread passes between said thread-guiding means and said one of said needles, said unidirectional means only permitting said thread to advance towards said one of said needles;

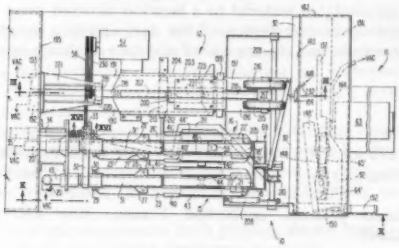
and Jacquard means to selectively raise and lower each of said first and second thread-guiding means in accordance with the pattern desired for said pile fabric.

4,020,775

TOE CLOSING MACHINE AND METHOD FOR PANTY HOSE

J. Frank King; Willie M. Lathery, and Howard L. Beamon, all of Winston-Salem, N.C., assignors to Hanes Corporation, Winston-Salem, N.C.

Filed July 21, 1975, Ser. No. 597,325
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.15 **20 Claims**



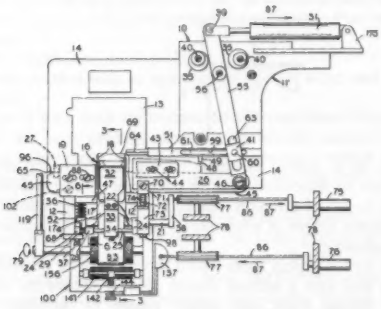
15. The machine of claim 14, further including suction means associated with the suction tubes for turning the garment right side out and transferring the garment to a depository.

4,020,776

FEEDING AND CUTTING ATTACHMENT FOR SEWING MACHINES

Frederick Haff, Jr., 161 Tanners Pond Road, Garden City, N.Y. 11530

Filed Sept. 5, 1975, Ser. No. 610,660
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.26 **3 Claims**



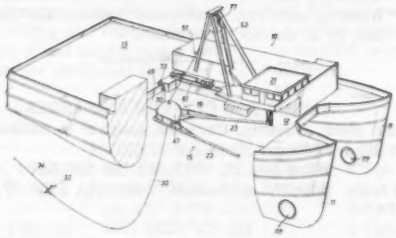
1. In apparatus for use with a sewing machine to intermittently apply strips of elastic material to a base material and having stitch-forming means and work-feeding means for feeding the materials to be sewed past the stitch-forming means during continuing sewing operation, the improvement which comprises: a mounting block, a feed finger and operatively connected rocking means therefor secured to said block, a substantially horizontal bracket plate having an intermediate pocket and to which plate said block is attached, a stud secured to the sewing machine for pivotally mounting the said bracket plate at one end, means between said bracket plate and other end of the sewing machine for releasably affixing said bracket plate to said machine, a guide plate secured in the pocket of said bracket plate, actuating means secured to said bracket plate and operatively connected to said rocking means to effect elastic strip feed along said guide plate to the stitch-forming area, a second bracket plate affixed to the sewing machine, reciprocable cutting means mounted on said second bracket and adapted to sever the elastic strip between said guide plate and stitch-forming area, second actuating means secured to said second bracket and operatively connected to said cutting means, a cam arm and folder for said base material carried thereby and pivotally mounted on said stud at one end, said cam arm having means for springable connections to said block at the other end of the cam arm, said cutting means having a stud operative on said cam arm to deflect said folder from the cutting path of said cutting means, each activation of the first actuating means for the rocker means and each activation of the second actuating means for the cutting means being successive for consecutive feed and cutting of the elastic strip.

4,020,777

VESSEL AND APPARATUS FOR AT-SEA RETRIEVAL OF BUOYS AND ANCHORS

Robert W. Brown, New Orleans, and Nico deBoer, Kenner, both of La., assignors to J. Ray McDermott & Co., Inc., New Orleans, La.

Continuation of Ser. No. 497,938, Aug. 16, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,648
Int. Cl.² B63B *35/44*
U.S. Cl. 114—258 **11 Claims**



1. Apparatus for capture of a floating object which comprises:

a powered catamaran vessel having two spaced hulls, said vessel being suitable for maneuverable advancement through a body of water toward an object floating at the surface of the water; and

retrieval apparatus disposed between said hulls for capturing and holding the object within said apparatus while said vessel is underway comprising a cradle that provides support to the underside of the object and unrestricted access to the object from above, and guide members which extend forwardly and outwardly of said cradle to direct the object away from said hulls and into said cradle;

said retrieval apparatus being secured to the inboard surface of said hulls, and being movable in a vertical direction to a position below water level to permit capture of the object while said vessel is underway and to a position completely above the water level to alternatively permit

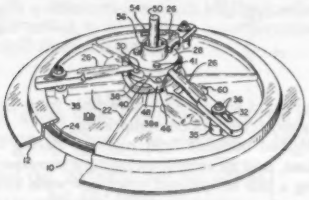
said object to be raised out of the water or permit said vessel to overrun the floating object.

4,020,778

HATCH COVER

Robert W. Sutton, Box 774, Port Orford, Oreg. 97465

Filed Feb. 13, 1976, Ser. No. 657,749
Int. Cl.² B63B *19/14*
U.S. Cl. 114—203 **18 Claims**



1. A plate-like hatch cover for closing a hatch opening comprising:

a cover plate, and a rim surrounding said opening including a rim flange forming a seat for said cover plate so that one side of said cover plate seats against an opposite side of said rim flange,

latching means including a latching hub rotatably on said one side of said cover plate and plural latching arms extending generally radially in different directions on said one side of said plate from said hub toward said rim for latching said cover plate to said rim flange,

connecting means pivotally connecting the inner ends of said latching arms to said latching hub and retention means loosely connecting intermediate portions of said arms to said cover plate and permitting said arms to extend generally radially outwardly into overlapping relation to one side of said rim flange corresponding to said one side of said cover plate when said hub rotates to a limited extent in one direction and so that said arms retract radially inwardly to clear said rim flange when said hub rotates to a limited extent in an opposite direction,

hub-rotating means for rotating said hub in opposite directions on said cover plate,

and camming surface means cooperable with said latching means and said retention means upon rotation of said hub in said one direction by said hub-rotating means to extend said arms and cause the outer ends of said arms to pry against said one side of said rim flange using said retention means as a fulcrum to urge an outer peripheral portion of said cover plate into tight seated engagement with said opposite side of said rim flange.

4,020,779

CHAIN/WIRE ROPE CONNECTOR ASSEMBLY FOR ANCHOR

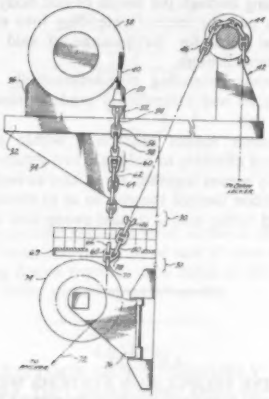
Daniel G. Kitt, Houston, Tex., assignor to Skagit Corporation, Sedro-Woolley, Wash.

Filed May 19, 1976, Ser. No. 687,964
Int. Cl.² B63B *21/50*
U.S. Cl. 114—293 **5 Claims**

1. In a system for anchoring a structure in the ocean or similar large body of water, wherein said system includes an anchor, an anchor chain connected to said anchor, a chain locker and a windlass with a length of lead chain for feeding chain into or out of said chain locker, a wire rope, a drum for storing said wire rope, a winch for driving said drum, a connector for connecting said anchor chain to said wire rope including a short length of leader chain, a work station on said structure, a special link having at least three openings connected to said anchor chain; and a first removable link connected to said special link and to said leader chain,

a method for retrieving and storing said wire rope, connector and anchor chain comprising the steps of

1. winding said wire rope on said drum until said special link is at said work station,
2. attaching a second removable link of chain to an available opening on said special link and to said lead chain,



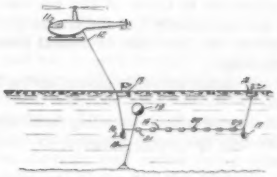
3. operating one of said winch and windlass to apply tension to said second removable link and to unload said first removable link,
4. opening and separating said first removable link from another loop and opening of said special link, and
5. operating said windlass to draw a desired length of said anchor chain into said chain locker.

4,020,780

MOORING CABLE CUTTING SYSTEM

Richard K. Shumaker, Panama City, and William G. Harris, Jr., Titusville, both of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 5, 1969, Ser. No. 870,550
Int. Cl.² B63B *21/60;* B63G *7/02, 7/04*
U.S. Cl. 114—243 **10 Claims**



1. A mine sweeping system for severing mooring cables or lines of moored marine mines located within a predetermined aqueous medium comprising in combination:

tractor vehicle means;

tow line means attached at one end to said tractor vehicle means for transmission of towing force therefrom;

sweep line means effectively attached to said tow line means to be towed thereby;

hydrodynamic means effectively attached to said sweep line means for deploying said sweep line means at a predetermined relative position with respect to said aqueous medium and the course of said tractor vehicle means, so as to perform a sweep over a predetermined path width;

cutter means connected to said sweep line means effective to impact said mooring cables or lines for the severing thereof wherein said cutter means comprises:

body means comprised of two structural parts mutually cooperating to form a unitary structure which is a figure of revolution about a centeral axis thereof;

sharpened edge means carried by said body means to face in a foreward direction along said axis of revolution;

a longitudinal bore extending along said axis of revolution and passing through the length of said body means and having a portion thereof extending into each of said structural parts for the passage of said sweep line means therethrough;

groove means extending circumferentially about said body means and extending a predetermined distance therein; and

spring retainer means positioned within said groove means and effective to hold said two structural parts of said body means together about said sweep line means for retention thereof therein, so as to structurally connect said cutter means to said sweep line means.

4,020,781
MARINE PROPULSION SYSTEMS WITH VARIABLE-PITCH SCREW PROPELLERS

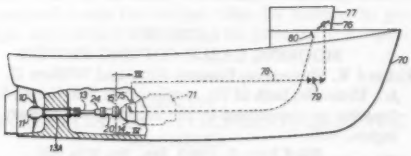
Wilfred Thomas Bellew, Rochdale, England, assignor to Newage Engineers Limited, Stamford, England

Filed Apr. 22, 1975, Ser. No. 570,955

Claims priority, application United Kingdom, Dec. 4, 1974, 52444/74

Int. Cl.² B63H *3/08*

U.S. Cl. 115—34 A **58 Claims**



26. A hydraulically operated two-position-only actuator for use in marine propulsion apparatus having a screw propeller with blades adjustable to either of two predetermined pitch angles which are respectively fine and coarse pitch angles and which are both on the same side of neutral blade pitch, said actuator comprising

a hydraulically sealed movable piston having first and second faces,

a piston rod secured to and extending from said first face in a first direction and being adapted for coupling to said propeller,

compression spring means disposed about said piston rod and operative on said first face for thrusting said piston to a predetermined limit in a second direction opposite to said first direction, and

power means disposed adjacent the second face of said piston and including reversible speed-reduction power transmission means having output shaft means containing a fluid passageway for supplying hydraulic fluid under predetermined pressure against said second piston face to move said piston against said compression spring means in said first direction to another predetermined limit, said limits correspondingly respectively to said coarse and fine propeller pitch angles whereby the propeller propulsion direction can be changed by said reversible transmission without changing its pitch.

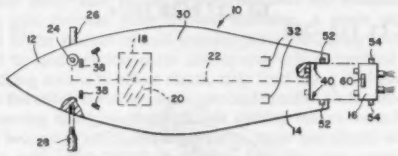
4,020,782
CONVERTIBLE SURFBOARD

John Gleason, 125-10 Queens Blvd., Kew Gardens, N.Y. 11415

Filed Jan. 26, 1976, Ser. No. 652,536

Int. Cl.² A63H *5/08*

U.S. Cl. 115—70 **6 Claims**



1. A surfboard selectively convertible from an unpowered mode to a motorized mode comprising:

an elongated buoyant float member having fore and aft sections, said aft section including a recessed area therein having a pair of opposed inner side walls located respectively and equidistantly on opposite sides of the longitudinal center line of said float member;

a cam track in each of said inner side walls extending longitudinally of said float member and adapted to shiftably support a motor for movement therealong between an upper operative position and a lower operative position, each said cam track having at least one detent-receiving recess in the portions thereof defining said operative and non-operative positions dimensioned to releasably retain a detent lug carried by the motor;

a motor shiftable mounted in said aft section of the float member having detent lugs thereon cooperable with said cam tracks and dimensioned to be removably positioned within the corresponding recesses in said cam tracks to thereby selectively locate said motor in one of said positions;

spring means positioned within said recessed area of the said aft section operatively connected to said motor and thereby adapted to urge said motor into locking relationship with said cam tracks;

an electric storage battery mounted in said float member; and electrical connecting and control means operatively connecting said battery and motor.

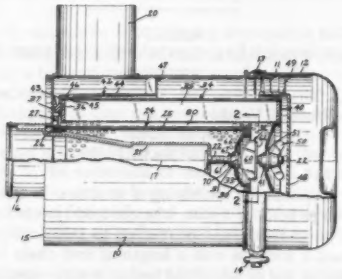
4,020,783
AIR CLEANER WITH RESTRICTION INDICATOR

Erland D. Anderson, Eden Prairie; David S. Paulson, Elko, and Bruce M. Sullivan, Burnsville, all of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Filed June 19, 1975, Ser. No. 588,291

Int. Cl.² G01L *7/08*

U.S. Cl. 116—114 PV **3 Claims**



1. In an air cleaner having an outer casing with an outlet connection, a principal filter within said casing, a safety filter within said principal filter, said filters jointly defining a ple-

num, and an outlet within said principal filter, said filters being supported within said casing by means including a central externally threaded member passing through central apertures in ends of said filters to receive filter securing clamping nuts, the improvement which comprises:

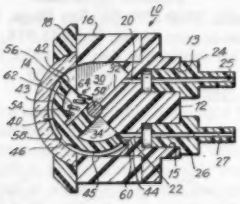
a clamping nut for securing said safety filter to said member, and comprising a body of non-circular configuration about an axis and having a central orifice extending along said axis between inner and outer surfaces transverse to said axis, said orifice being internally threaded to engage said member, a further orifice in said outer surface, passage means connecting said further orifice with said inner surface, and a differential pressure indicator mounted in said further orifice to be exposed for observation when said principal filter is removed.

4,020,784

VISUAL INDICATOR FOR A FLUID OPERATED SYSTEM

Sanford I. Greene, Hollywood, Fla., assignor to Micro Pneumatic Logic, Inc., North Miami Beach, Fla.

Filed Oct. 24, 1975, Ser. No. 625,661
Int. Cl.² G01L *19/12*
U.S. Cl. 116—114 PV **8 Claims**



1. A visual indicator for indicating when fluid pressure in one or two fluid channels exceeds fluid pressure in the other fluid channel by a minimum amount in the range 0.15 to 0.50 psig, comprising:

a housing formed of a plurality of members defining a compartment therein and having a substantially fluid-tight cover;

said one and said other fluid channels in said housing terminating at respective first and second outlets discharging into said compartment for applying fluid pressures thereto;

a vane rotatably mounted on a member in said compartment and responsive to the selective application of fluid pressures to said fluid channels for rotation between first and second extreme positions, said vane having spaced apart outlet sealing members at end portions thereof for substantially sealing the first and second outlets in accordance with the extreme rotary positions assumed by said vane to prevent fluid from flowing through a corresponding one of said fluid channels; and

indicia bearing means mounted on said vane for selectively disposing said indicia in an indicating position to be viewed through said cover when said vane rotates to a corresponding one of said first and second extreme positions.

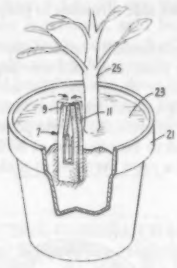
4,020,785

PLANT MOISTURE INDICATOR

Walter E. Palmer, 266 Connecticut, San Francisco, Calif. 94107

Filed May 19, 1976, Ser. No. 688,086
Int. Cl.² G01N *25/56, 33/24*
U.S. Cl. 116—118 A **2 Claims**

1. A soil moisture indicator comprising an elongated U-shaped member having a base adapted to be partially inserted for a portion of its length in soil with a bight of the U down and with the two arms of the U extending upwardly, said U being fabricated of wood and having a rigid, waterproof adhesive coating the bight and the lower portions of the inner surfaces of the arms of the U, the grain of the wood running at right angles to the longer dimension of the arms of the U, and the



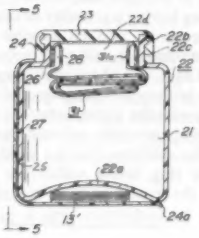
grain running parallel with the inner surfaces of the arms of the U-shaped member, the arms of said U above said coated portions being drawn towards each other in the presence of moisture and being spread apart when dry.

4,020,786

BALLOON SIGNAL ASSEMBLY

Saul Z. Kopelka, 310 Concord Road, Aston, Pa. 19014

Filed Dec. 24, 1975, Ser. No. 644,029
Int. Cl.² B64B *1/52*
U.S. Cl. 116—124 B **11 Claims**



1. A signal assembly comprising:

a. an inflatable means capable of retaining a lighter-than-air gas,

b. container means which contains said gas and in which said inflatable means is disposed in substantially deflated condition and has an open terminal portion fixed thereto whereby the interior of said inflatable means is always in communication with said gas, said container means including movable wall means which normally prevents said gas and inflatable means for escaping said container means, said movable wall means being adapted to be manually dislodged whereupon the pressurized gas within said container forces the unrestrained parts of said inflatable means out of said container means.

4,020,787

VISUAL ALTITUDE ALERTING INDICATOR

Raoul Castro, Winfield; Herbert H. Kleist, Oak Lawn, and Louis O. Meredith, Orland Park, all of Ill., assignors to Diversified Interests Inc., Orland Park, Ill.

Filed Nov. 21, 1975, Ser. No. 634,037
Int. Cl.² G09F *9/00*
U.S. Cl. 116—129 K **8 Claims**

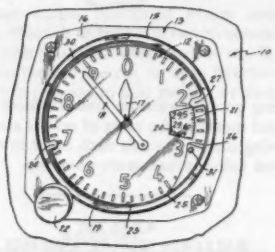
1. In a visual preparatory landing altitude alerting indicator for aircraft and the like and in combination with an altimeter

having hands movable thereabout to indicate the altitude of the aircraft, and a rim,

visual altitude alerting means for said altimeter and cooperating with said hands to alert the pilot through visual cues of the altitudes that must be maintained to prevent flying below prescribed safe altitudes in preparation for landing comprising

a series of circumferentially spaced alerting indicators,

means adjustably mounting said alerting indicators for rotatable movement about the rim of the altimeter, and accommodating said alerting indicators to be set to indicate a plurality of critical altitude positions in preparation for landing, and to be adjusted at Before Landing Check List, to remind a crew member to make call-outs at a first



predetermined altitude above landing decision height, a second predetermined lower altitude above decision height, a third predetermined lower altitude above decision height and alerting the pilot to apply power to level the aircraft at decision height,

including a ring having a plurality of said alerting indicators spaced thereabout, and an annular support forming a bearing mounting for said ring, accommodating the adjustment of said ring about said support,

said alerting indicators being spaced about said ring in accordance with the altitudes to be called out for landing and extending inwardly of said ring and the bearing mounting for said ring being a yieldable expansible and contractible ring fitting within the altimeter and held thereto by the expansibility of said ring fitting.

4,020,788

DOCTORING MEANS

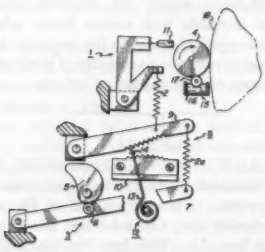
Edric R. Brooke, Welwyn Garden City, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 22, 1975, Ser. No. 624,628

Claims priority, application United Kingdom, Nov. 20, 1974, 50314/74

Int. Cl.² B05C *1/00, 11/04*

U.S. Cl. 118—7 **10 Claims**



1. An apparatus for controlling the pressure of a doctoring means against a surface to be doctored responsive to changes in the ambient temperature, which comprises:

a. a surface to be doctored and doctoring means capable of engaging said surface;

b. a set of jaws wherein one of said jaws is stationary and another of said jaws is connected by extendable linkages to said doctoring means and to a means for repeatedly moving said jaws to a closed position, said movement being effective to bring the doctoring means into pressure contact with the surface sought to be doctored;

c. interposer means movably positioned between the stationary member and the movable member of the set of jaws for limiting the closing of the jaws responsive to ambient temperature such that the pressure of the doctoring means against the surface sought to be doctored is decreased at lower temperatures and increased at higher temperatures; and

d. means for controlling the position of the interposer relative to ambient temperature.

4,020,789

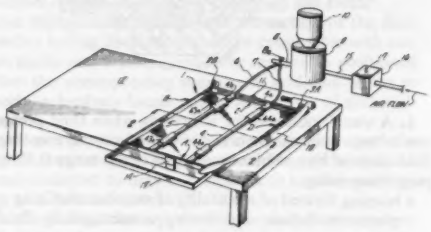
FABRIC MARKER

Steve Gamvrellis, 3860 35th St., San Diego, Calif. 92104

Continuation-in-part of Ser. No. 421,918, Dec. 5, 1973, abandoned. This application Feb. 26, 1975, Ser. No. 553,232

Int. Cl.² B05C *19/00*

U.S. Cl. 118—308 **5 Claims**



1. A fabric marking device comprising:

A. a frame having a work surface including an area perforated therethrough; means for depositing a marking powder on at least one predetermined line simultaneously through multiple layers of fabric positioned on said perforated area, thereby leaving a distinct and accurate indicia on both sides of the fabric layers;

B. said means including at least one tubular member having a lengthwise slit through the wall thereof, and connected to a source of marking powder emitable through said slit under sufficient pressure for the powder to pass through said layers;

C. said tubular member, or members, being controllably positioned with the slit thereof ready for contact with a fabric layer positioned on said perforated area;

D. a marking powder container;

E. means for delivering marking powder from said container to a mixing valve whereby said mixing valve accepts a predetermined quantity of marking powder;

F. means for delivering air under pressure to said valve, said valve being provided with means whereby said delivery of pressurized air interrupts said marking powder delivery means, said predetermined quantity of marking powder is mixed with said pressurized air for deposit on said fabric layers, and said marking powder delivery means are reactivated to provide subsequent delivery of a predetermined quantity of marking powder when said air delivery means are deactivated;

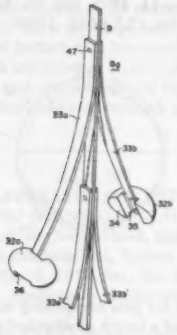
G. conduit means connecting said tube, or tubes, to said valve.

4,020,790

APPARATUS FOR FORMING COATING ON A TUBULAR TEXTILE JACKET

Masakatsu Hyodo, and Hitoshi Inoue, both of Osaka, Japan, assignors to Ashimori Kogyo Kabushiki Kaisha (Ashimori Industry Co., Ltd.), Osaka, Japan

Filed Aug. 2, 1974, Ser. No. 494,304
Claims priority, application Japan, Aug. 4, 1973, 48-87897; Mar. 22, 1974, 49-32340
Int. Cl.² B05C 3/12; D06C 5/00
U.S. Cl. 118—44 8 Claims



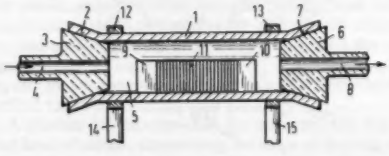
1. An expanding assembly for maintaining a tubular textile jacket in a substantially circular or elliptical cross-sectional shape for a predetermined distance while a coating is applied to the exterior surface of the jacket and said coating is solidified, which comprises a connecting member attached to extend longitudinally along the interior surface of the tubular jacket, a plurality of spring members each having a fixed end and a free end, said fixed end being attached to the connecting member at intervals along the longitudinal direction of said connecting member, the free end of each of said spring members being provided with a pressing element so that said pressing element is joined to said connecting member by said spring member, said spring member pressing against the internal surface of the textile jacket, thereby maintaining said jacket in said substantially circular or elliptical cross-sectional shape and a holding member disposed at one terminal end of said expanding assembly for maintaining it in a definite position within the tubular textile jacket.

4,020,791

APPARATUS FOR INDIFFUSING DOPANTS INTO SEMICONDUCTOR MATERIAL

Konrad Reuschel, Vaterstetten; Wolfgang Keller, Pretzfeld; Arno Kersting, Erlangen, and Reimer Emeis, Ebermannstadt, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Division of Ser. No. 295,173, Oct. 5, 1972, Pat. No. 3,868,924, which is a continuation of Ser. No. 50,087, June 26, 1970, abandoned. This application Nov. 19, 1974, Ser. No. 525,176
Claims priority, application Germany, June 30, 1969, 1933128
Int. Cl.² C23C 13/08
U.S. Cl. 118—49.1 4 Claims



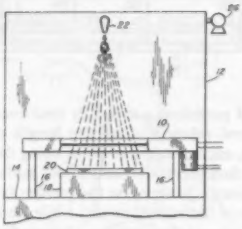
1. Apparatus for indiffusing dopants into a semiconductor material which comprises a heatable tube of the same semiconductor material in which the semiconductor material is accomodated and in which the doping substance is found, said semiconductor material of said heatable tube being doped to permit low voltage for starting heating-up of said tube, the wall of the tube is from 0.5 to 20 mm thick, is virtually gastight under diffusion conditions, said heatable tube having attached thereto an electrode near each of its ends, and means connected to said electrodes for passing an electric current directly through said heatable tube along its entire length from one electrode at one end of the tube to the other electrode at the other end of the tube to cause said tube to become heated along its entire length.

4,020,792

SELECTIVE CORONA CHARGER

John Francis Jordan, El Paso, Tex., assignor to Photon Power, Inc., Wilmington, Del.

Filed Mar. 22, 1976, Ser. No. 669,279
Int. Cl.² B05B 5/02
U.S. Cl. 118—629 6 Claims



1. An apparatus for coating a workpiece with a compound, said apparatus being of the type comprising a droplet generator for generating droplets and a charging means for electrically charging said droplets, in the operation of which said droplets receive a charge from said charging means before impining said workpiece, wherein said charging means comprises:

an electrical conductor means;

means for defining a grid comprised of said conductor means;

means for moving said conductor means within said grid;

scraper means for removing excess compound impinging on said conductor means; and

an electrical power source in electrical contact with said conductor means;

the physical characteristics of said grid and said electrical power source being chosen so as to generate a corona effect within the area surrounding said conductor means.

4,020,793

APPARATUS AND METHOD FOR RAISING AND TRANSPORTING POULTRY

Johnny Randall Morrison, Dalton, Ga., assignor to B & J Machinery Co., Inc., Dalton, Ga.

Filed Dec. 29, 1975, Ser. No. 644,436
Int. Cl.² A01K 31/06
U.S. Cl. 119—18 6 Claims

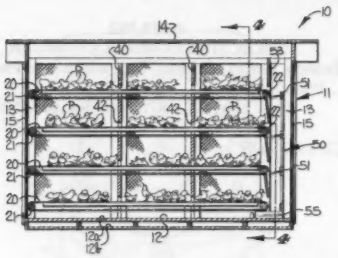
1. An apparatus for raising and transporting poultry or the like and being characterized by a self-contained, portable construction for receiving the poultry upon leaving a brooder and for containing the poultry until reaching maturity and for transporting the poultry therein to a processing plant to thereby eliminate the necessity of repeated manual handling of the poultry, said apparatus comprising:

a portable enclosure adapted to receive and contain poultry during growth and being of a size and construction suit-

able for being transported with the poultry therein by a truck, railway car or the like,

a plurality of substantially horizontally extending endless conveyors movably mounted in said enclosure in a vertically spaced and vertically aligned relationship with respect to each other, and each conveyor having an upper surface serving as a floor for supporting the poultry and receiving droppings therefrom,

means carried by said enclosure for rotatably interconnecting said conveyors such that said conveyors are adapted to be advanced in unison and the droppings and dead and infirm poultry may be moved to the downstream end of said conveyors for removal,



a plurality of partitions carried by said enclosure in transverse spaced relation along the length of each of said conveyors, each of said partitions being disposed a predetermined distance above said upper surface of the associated conveyor to separate the poultry into groups along the length of the conveyor and while permitting the passage of dead or infirm poultry thereunder,

means carried by said enclosure adjacent the downstream end of each of said conveyors for cleaning the surface thereof as the conveyor is advanced to thereby remove the droppings from the conveyor, and

means for removably mounting said partitions within said enclosure to facilitate the loading and unloading of the poultry.

4,020,794

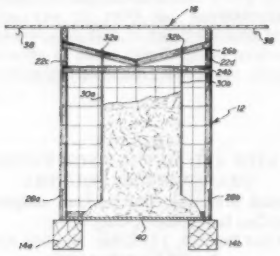
PORTABLE ANIMAL FEEDING STATION

Verlin Nethery, 2501 Glen Springs Way, Austin, Tex. 78741

Filed Aug. 27, 1975, Ser. No. 608,143

Int. Cl.² A01K *5/00, 5/01*

U.S. Cl. 119—58 **10 Claims**



1. A portable animal feeding station comprising:

mobile support means; and

a rectangular-shaped, variable volume hopper mounted on said support means and adapted for confining fibrous feed, said rectangular-shaped variable volume hopper comprising a pair of spaced-apart, upstanding, opposing end walls, at least one rigid, perforated side panel having perforations of sufficient size for livestock to pull the feed material therethrough, and means mounted on said end walls for slidably and movably supporting suspension means on said panel such that livestock feeding through said perforations continually urge said panel into said variable volume hopper and against the confined feed material.

4,020,795

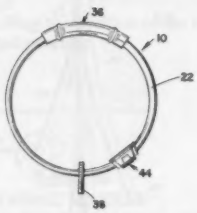
CHOKE COLLAR FOR PETS

James A. Marks, 15207 Otsego St., Sherman Oaks, Calif. 91403

Filed May 11, 1976, Ser. No. 685,399

Int. Cl.² A01K *27/00*

U.S. Cl. 119—106 **5 Claims**



1. A choke collar for pets comprising in combination:

a core consisting of a length of stranded cable, the free ends of which each terminate in an enlarged bead;

a sheath of synthetic plastics material enclosing said core throughout substantially its entirety between said beads;

a first enlongated locking element secured at one end thereof to said core adjacent one of said beads thereof and having fastening means thereon;

a second elongated locking element having fastening means thereon cooperable with the fastening means of said first locking element for releasably securing said first and second locking element in any of a pluraity of collar length determining settings, said second locking element being adapted at one end thereof to be releasably secured to said core adjacent the other of said beads;

a lock sleeve slidably mounted on said sheath and dimensioned to be positionable over said first and second locking elements to conceal said locking elements therebeneath;

and means slidably secured to said sheath for connection to a leash.

4,020,796

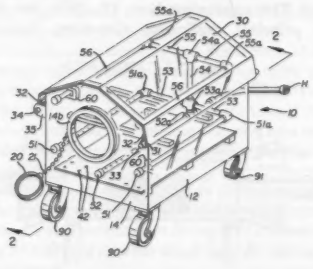
PORTABLE ANIMAL BATHING APPARATUS

Mary J. Grifa, 2966 Prange Drive, Cuyahoga Falls, Ohio 44223

Filed June 5, 1975, Ser. No. 584,037

Int. Cl.² A01K *13/00*

U.S. Cl. 119—158 **7 Claims**



1. A portable animal bathing apparatus for use with a water source, comprising;

A. a box-like enclosure having
1. a bottom wall,
2. opposed end walls secured to said bottom wall, and 3. opposed side walls secured to said bottom wall and said end walls thereby forming an enclosure with a normally open top;
B. a removable top member;
C. a network of perforated spray pipes received interiorly of said enclosure and including
1. a first pair of spaced pipes disposed along said side walls adjacent the bottom edges thereof
2. a second pair of spaced pipes disposed along said side walls adjacent the top edges thereof, and
3. at least one centrally disposed spray pipe disposed adjacent said bottom wall intermediate said first pair of spaced pipes and lying in a plane parallel to the planes of said first and second pairs of pipes; and
D. means for connecting said network of pipes to the water source.

4,020,797

PROCESS AND APPARATUS FOR USING WASTE HEAT OF REFUSE BURNING INSTALLATIONS

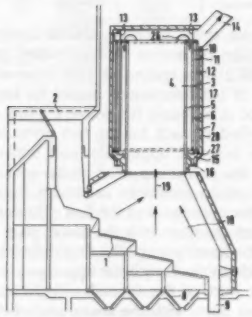
Franz O. Hug, Zumikon, Switzerland, assignor to Ofag Ofenbau-und Feuerungstechnik AG, Zurich, Switzerland

Filed May 4, 1976, Ser. No. 682,987

Claims priority, application Switzerland, May 7, 1975, 5875/75

Int. Cl.² F22B *1/00, 21/26*

U.S. Cl. 122—2 **10 Claims**



1. Apparatus for using the exhaust heat from burning refuse, comprising means providing a combustion chamber wherein refuse can be burnt, enclosure means mounted directly above said combustion chamber providing a vertically extending heat exchanger compartment for receiving smoke and gas products of combustion from said combustion chamber, said enclosure means being formed at the upper end thereof with an outlet for said smoke and gas, and a heat exchanger mounted within said enclosure means, said heat exchanger comprising at least two tube packs each consisting of a tubular unit formed by at least one helically wound tube, said tube packs being mounted concentrically with clearance therebetween and with clearance between the outer one of said concentric packs and said enclosure means whereby smoke and gas ducts are provided within the innermost one of said concentric packs, between said concentric packs and between said enclosure means and said outer one of said concentric packs, and said enclosure means being arranged for smoke and gas passing through said ducts to escape through said outlet, and means for supplying fluid to and leading fluid from the helical tubes constituting said packs.

10. A process for economically for economically using the exhaust heat of refuse, comprising the steps of burning refuse in a combustion chamber to generate smoke and gas therefrom, passing said smoke and gas directly upwards through a tubular unit consisting of at least one helically wound tube thereby heating said unit by radiant heat, deflecting said smoke and gas through 180° at the top of said unit so as to pass downwards between the outside of said unit and a second tubular unit containing said first unit and also consisting of at least one helically wound tube, deflecting said smoke and gas through 180° at the bottom of said second tubular unit so as to pass upward between said second tubular unit and a wall forming part of a compartment containing said tubular units thereby heating said second unit by convection heat, discharging said smoke and gas from said compartment at the top thereof, and passing fluid through said helically wound tubes while said smoke and gas is flowing over said units.

4,020,798

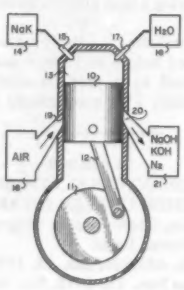
INTERNAL COMBUSTION ENGINE FUELED BY NaK

Stephen F. Skala, 3839 S. Wenonah Ave., Berwyn, Ill. 60402

Continuation-in-part of Ser. No. 301,285, Oct. 27, 1972, abandoned, and a continuation-in-part of Ser. No. 435,117, Jan. 21, 1974, abandoned, and a continuation-in-part of Ser. No. 464,454, April 26, 1974, abandoned. This application May 19, 1975, Ser. No. 578,527

Int. Cl.² F02B *45/00*

U.S. Cl. 123—1 A **3 Claims**



1. In an engine having an internal combustion chamber and power generating displaceable engine means in said combustion chamber, the improvement comprising
a source of liquid sodium-potassium fuel, injection means joining said source of fuel to said internal combustion chamber,
a source of water, injection means joining said source of water to said combustion chamber,
means to introduce oxygen into said internal combustion chamber, said heat of explosive reaction directly operating said power generating displaceable engine means, and
collector means outside said internal combustion chamber to collect and store gaseous and hydroxide by-products of combustion.

4,020,799

ROTARY PISTON INTERNAL COMBUSTION ENGINE WITH A STRATIFIED CHARGE INTAKE PORT SYSTEM

Yoshikazu Ishikawa, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 433,509, Jan. 15, 1974. This application Nov. 11, 1975, Ser. No. 630,921

Claims priority, application Japan, Jan. 17, 1973, 48-7701

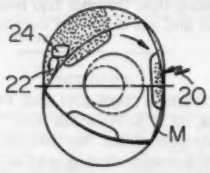
Int. Cl.² F02B *53/04*

U.S. Cl. 123—8.13 **2 Claims**

1. A rotary piston internal combustion engine comprising:
a housing having a cavity, said housing having a two lobed peripheral wall and two oppositely facing end walls interconnected by a peripheral wall to define the cavity;
a rotary piston rotatably disposed in the cavity to form a plurality of working chambers in cooperation with said housing walls, said rotary piston having sides each of

which is formed with a recess that is deeper in the center of each side of said rotary piston;

one of the two oppositely facing end walls having an auxiliary intake port opening to the cavity and a main intake port opening to the cavity, said main intake port being located in front of, and adjacent said auxiliary intake port with respect to the direction of rotation of said piston and both of said intake ports being configured and sized such that the both of said intake ports commence to communicate with one of the working chambers and said main



intake port is closed after said auxiliary intake port is to complete the intake phase of the one working chamber;

means for supplying a rich mixture to said auxiliary intake port;

means for supplying a lean mixture to said main intake port; and

ignition means including a spark plug which is located at a position spaced before the minor axis of the two lobed pheripheral wall by a predetermined angular distance from substantially 7° to substantially 8°.

4,020,800

ROTARY PISTON INTERNAL COMBUSTION ENGINE WITH A STRATIFIED CHARGE INTAKE PORT SYSTEM

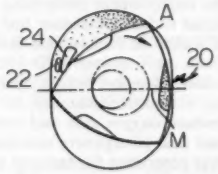
Yoshikazu Ishikawa, Chofu, Japan, assignor to Nissan Motor co., Ltd., Yokohama, Japan

Division of Ser. No. 433,509, Jan. 15, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,805

Claims priority, application Japan, Jan. 17, 1973, 48-7701

Int. Cl.² F02B *53/04*

U.S. Cl. 123—8.13 **2 Claims**



1. A rotary piston internal combustion engine comprising:

a housing having a cavity, said housing having a two lobed peripheral wall and two oppositely facing end walls interconnected by the peripheral wall to define the cavity;

a rotary piston rotatably disposed in the cavity to form a plurality of working chambers in cooperation with said housing walls, said rotary piston having sides each of which is formed with a recess that is deeper in the leading half of each side of said rotary piston;

one of the two oppositely facing end walls having an auxiliary intake port opening to the cavity and a main intake opening to the cavity, said auxiliary intake port being located radially outward of said main intake port with respect to the direction of rotation of said rotary piston and both of said intake ports being configured and sized such that said auxiliary intake port commences to communicate with one of the working chambers before said main intake port does and said main intake port is closed after said auxiliary intake port is to complete the intake phase of the one working chamber;

means for supplying a rich mixture to said auxiliary intake port;

means for supplying a lean mixture to said main intake port; and

ignition means including a spark plug which is located at a position spaced before the minor axis of the two lobed peripheral wall by a predetermined angular distance from substantially 7 degrees to substantially 8 degrees.

4,020,801

TWO-STROKE, MULTICYLINDER, SPARK IGNITION, PUMPLESS INJECTION INTERNAL COMBUSTION ENGINE

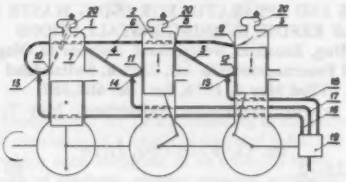
Stanislaw Jarnuszkiewicz, Krakow, Poland, assignor to Politechnika Karkowska, Krakow, Poland

Filed Nov. 7, 1974, Ser. No. 521,896

Claims priority, application Poland, Nov. 9, 1973, 166446

Int. Cl.² F02C *75/20*

U.S. Cl. 123—32 SP **1 Claim**



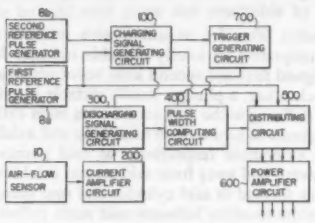
1. A two-stroke, spark ignition, internal combustion engine with fuel injection by means of combustion gases having a crank-shaft with cranks spaced at 120° intervals comprising: ignition means of 1-3-2 sequence, means for supplying fuel at a predetermined rate, means for delivering fuel with three gas ducts, three cylinders each having two ports in the cylinder wall, said ports being an upper inlet port between the piston midstroke and the piston top dead center and a lower outlet port below the piston midstroke and the bottom dead center, in said engine the upper port of the first cylinder communicating through said gas duct with the lower port of the second cylinder, and the lower port of the first cylinder communicating through said gas ducts with the upper port of a third cylinder, the upper port of the second cylinder communicating through said gas ducts with the lower port of the third cylinder, said means for delivering fuel being connected to each of said gas ducts so that combustion gases in the cylinder flow through the gas duct to the cylinder in which the piston is near the bottom dead center and entrain fuel being delivered to this respective duct by said fuel delivering means, said flow being completed when the lower outlet port is covered by the piston, the injection having occurred in the cylinder after opening of the upper inlet port by the piston, the upper port of the first cylinder communicating through the gas duct with the lower port of the third cylinder and the lower port of the first cylinder communicates through the gas duct with the upper port of the second cylinder, and the lower port of the second cylinder communicates through the gas duct with the upper port of the third cylinder, said means for delivering fuel being connected to each of said gas ducts, said gas ducts communicating in said sequence with working spaces of said cylinders, the fuel being delivered at a predeterminated rate, three fuel proportioners having open valveless means, a metering space of cubic capacity greater than the maximum dose of fuel per one working cycle, a necked-down inlet passage and a necked-down outlet passage, each proportioner communicating by the outlet passage with one gas duct and by the inlet passage with means for delivering fuel at a predetermined rate, fuel through the inlet passage flowing into the metering space, the combustion gases passing the gas duct to the metering space through the outlet passage for displacing the fuel dose enclosed in it and extruding said dose through the same outlet passage to the gas duct,

precombustion chambers, in said engine said lower outlet ports of gas ducts in cylinder walls being directed towards the inlet of precombustion chambers, the injection stream injected from said ports forming a substantially rich mixture in the precombustion chamber, an exhaust manifold, in said engine said gas ducts communicating with said cylinders being on a predetermined part of its length in said exhaust manifold, said ducts being preheated by combustion gases, said upper inlet ports in cylinders walls being located higher than the height of piston seal rings, oil collecting on edges of said ports lubricating the cylinder at the instant when the port is uncovered by the piston ring and is forced by gas pressure above the ring between the cylinders bearing surface and the piston.

4,020,802
FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

Tadashi Hattori, Nishio; Takamichi Nakase, Gamagori, and Minoru Nishida, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Feb. 20, 1975, Ser. No. 551,506
Claims priority, application Japan, Mar. 21, 1974, 49-32383
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EA **3 Claims**



1. In combination with an internal combustion engine having a plurality of cylinders, each thereof including a main combustion chamber, a sub-combustion chamber interconnected to said main combustion chamber through a hole, an intake valve mounted in a passage interconnecting said combustion chambers and a suction port and a spark plug positioned in said sub-combustion chamber,

a fuel injection system comprising:

a fuel injection valve positioned in the suction port of each of said cylinders for injecting fuel toward said hole to form a rich air-fuel mixture in said sub-combustion chamber;

pulse generating means for generating reference pulses in synchronism with the rotation of said engine;

an air-flow sensor positioned in the suction duct of said engine for generating a signal voltage corresponding tothe quantity of air drawn into said engine;

a pulse width cmputing circuit responsive to said reference pulses and said signal voltage for generating a pulse for controlling the timing and duration time of the opening of said fuel injection valves;

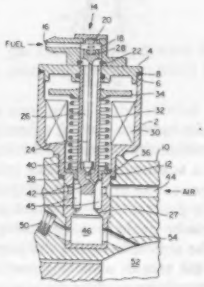
injection mode changing computing means connected to said air-flow sensor for generating a signal indicative of the operating conditions of said engine in response to said sensor signal voltage; and

a distributing circuit connected between said pulse width computing circuit and said fuel injection valves including logic means for receiving said signal generated from said injection mode changing computing means, and including further layer means for receiving said pulse from said pulse width computing circuit is sequentially applied to said fuel injection valves in the intake stroke of said cylinders in accordance with the firing order of said cylinders when the amount of air drawn into said engine is smaller than a predetermined value, whereas said pulse from said pulse width computing circuit is applied simultaneously to said fuel injection valves for all of said cylinders when said amount of air is greater than said predetermined value.

4,020,803
COMBINED FUEL INJECTION AND INTAKE VALVE FOR ELECTRONIC FUEL INJECTION ENGINE SYSTEMS

John B. Thuren, Norman, Okla., and Ambrose Tomala, Royal Oak, Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Oct. 30, 1975, Ser. No. 627,484
Int. Cl.² F02B *3/00, 19/10*
U.S. Cl. 123—32 VN **4 Claims**



1. Combined fuel injection and air intake apparatus for an internal combustion engine, comprising:

a substantially hollow longitudinal extending housing mounted to the engine manifold;

longitudinally extending valve means supported within the housing and manifold;

an air-fuel mixing chamber within the manifold;

the valve means including a longitudinally extending channel;

fuel flow metering means supported within the channel in operative relation with the valve means;

a fuel inlet conduit in communication with the channel;

an air inlet conduit in communication with the mixing chamber;

solenoid means supported within the housing in cooperative relation with the valve means and fuel flow metering means, said valve means being seated to prevent communication between the mixing chamber and a combustion chamber within the manifold, and the fuel metering means being seated to prevent communication between the channel and the mixing chamber, when the solenoid means is de-energized;

energization of the solenoid means displacing the valve means and the fuel metering means to unseat both of said means, whereupon fuel is injected into the mixing chamber to provide an air-fuel mixture which is supplied to the combustion chamber; and

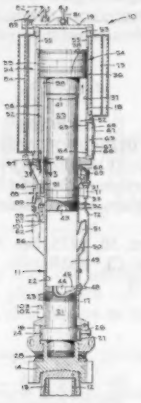
means arranged with the fuel metering means so that upon energization of the solenoid means the fuel metering means is displaced a predetermined distance with the valve means until the fuel metering means is stationary, and the valve means is displaced away from the stationary fuel metering means whereupon both of said means are unseated.

4,020,804

DIESEL PILE HAMMER WITH VENT FOR STARTING

Kenneth E. Bailey, Cedar Rapids, Iowa, assignor to FMC Corporation, San Jose, Calif.

Filed Dec. 8, 1975, Ser. No. 638,397
Int. Cl.² F02B *71/00*; F02N *17/00*
U.S. Cl. 123—46 R **7 Claims**



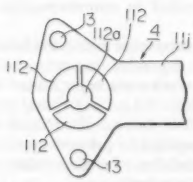
1. In a diesel pile hammer having a housing, a ram being slidably disposed within the housing and cooperating with the housing to define a scavenging chamber and a power chamber, means interconnecting said scavenging chamber with said power chamber for gases to flow from the power chamber to the scavenging chamber, said housing having at least one port therein between the atmosphere and the power chamber, and means for raising the ram to a starting position, the improvement comprising means for venting the scavenging chamber to the atmosphere as the ram is elevated by the ram raising means.

4,020,805

INTAKE MANIFOLD FLOW EQUILIZING MEANS

Toshiaki Konomi; Joji Nurita, both of Susono, and Yasushi Tanazawa, Nagoya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Division of Ser. No. 412,021, Nov. 1, 1973, Pat. No. 3,965,873.
This application Dec. 11, 1975, Ser. No. 639,704
Claims priority, application Japan, July 12, 1973, 48-77871
Int. Cl.² F02B *75/18*
U.S. Cl. 123—52 M **3 Claims**



1. An intake manifold for a multicylinder internal combustion engine of the type including a riser connected to a carburetor and branch pipes connecting the riser to intake ports of respective cylinders of the engine, the manifold being separable from the engine at an interface lying in a plane intersecting respective portions in each of the branch pipes, wherein the improvement comprises:

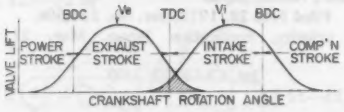
a flat gasket inserted at said interface and having orifices located at said positions in said respective branch pipes for limiting the cross-sectional flow area at each of said positions to a preselected magnitude for equalizing the pressure drops across said orifices wherein each orifice is formed of a plurality of angularly spaced annular segmental openings surrounding an imperforate portion of the gasket centrally positioned in the respective branch pipe.

4,020,806

HYDRAULIC VALVE LIFTER FOR INTERNAL COMBUSTION ENGINE

Shunichi Aoyama, and Yoshimasa Hayashi, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 29, 1975, Ser. No. 645,253
Claims priority, application Japan, Dec. 28, 1974, 49-1405
Int. Cl.² F01L *1/24*
U.S. Cl. 123—90.55 **5 Claims**



1. A valve lifter for an automotive internal combustion engine, comprising an axially movable cylinder formed with axially aligned first and second axial bores which are continuous to each other, a plunger axially slidable in said first axial bore and defining in the first axial bore a main cylinder chamber contiguous to said second axial bore and axially contractable and extendible respectively as said plunger is axially moved toward and away from said second axial bore, passageway means formed in said cylinder and said plunger for providing communication between said main cylinder chamber and a source of fluid under pressure, check valve means positioned within said main cylinder chamber for blocking the communication between the cylinder chamber and the fluid source in response to an increase in the fluid pressure in said main cylinder chamber over the fluid pressure developed in said passageway means, a floating piston means axially slidable in said second axial bore for defining in the second axial bore an auxiliary cylinder chamber which is in communication with said main cylinder chamber and which is continuously axially contractable between a zero volume condition and a maximum volume condition as said floating piston is axially moved in said second axial bore in response to variation in the fluid pressure in the main cylinder chamber, and biasing means for urging said floating piston toward an axial position providing said zero volume condition of said auxiliary cylinder chamber.

4,020,807

IGNITION-CONTROL SYSTEM FOR INTERNAL-COMBUSTION ENGINE

Giorgio Del Zotto, Cividale (Udine), and Mario Costa, Milan, both of Italy, assignors to SGS-ATES Componenti Elettronici S.p.A., Agrate (Milan), Italy

Filed Jan. 16, 1974, Ser. No. 433,652
Int. Cl.² F02P *1/00*
U.S. Cl. 123—117 R **10 Claims**

1. A system for timing the operation of an igniter to fire a combustible mixture in a piston cylinder of an internal-combustion engine with reference to a predetermined point in an operating cycle of its piston, comprising:

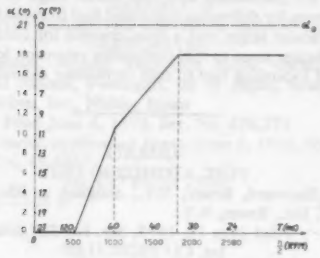
switch means for generating a recurrent start pulse to signal the beginning of a cycle of variable duration T;

measuring means including a first capacitor provided with first charging means activatable by said start pulse for generating a first voltage proportional to said duration T;

a second capacitor provided with second charging means

activatable by said start pulse for generating a monotonically varying second voltage;

comparison means connected to said first and second capacitors for generating a stop pulse upon said first and second voltages attaining a predetermined relationship; and



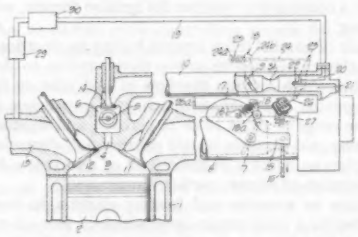
ignition-control means connected to said comparison means for emitting a trigger pulse at the end of a delay period determined by the magnitudes of said first and second voltages, said ignition-control means including a flip-flop settable by said start pulse and resettable by said stop pulse.

4,020,808

EXHAUST GAS RECIRCULATION FOR EMISSIONS CONTROL

Shizuo Yagi, and Kiyoshi Miyaki, both of Asaka, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 21, 1974, Ser. No. 444,415
Claims priority, application Japan, Feb. 23, 1973, 48-21338
Int. Cl.² F02B *25/06*
U.S. Cl. 123—119 A **2 Claims**



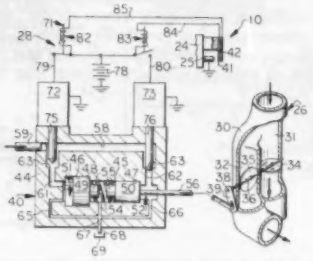
1. In an internal combustion piston engine, the combination of: walls including a piston forming a main combustion chamber, walls forming an auxiliary combustion chamber, a torch nozzle connecting said chambers, ignition means associated with said auxiliary chamber, a main intake passage for conducting a lean mixture to the main chamber, an auxiliary intake passage for conducting a rich mixture to the auxiliary chamber, said auxiliary intake passage including a carburetor venturi for inducting fuel into said auxiliary intake passage, means forming a valved exhaust passage leading from the main chamber, and passage means connected to said exhaust passage and to said auxiliary intake passage at a location spaced from said carburetor venturi for delivering a portion of the exhaust gases to the auxiliary intake passage.

4,020,809

EXHAUST GAS RECIRCULATION SYSTEM FOR A DIESEL ENGINE

Richard A. Kern, Pekin; Carl L. McClung, Metamora, and James R. Turner, Chillicothe, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 2, 1975, Ser. No. 583,230
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **6 Claims**



1. An exhaust gas recirculating system for a diesel engine having an intake manifold and an exhaust manifold, said system comprising:

conduit means connected to the exhaust manifold and having a first passage for conducting exhaust gas from the exhaust manifold to the atmosphere and a second passage for conducting exhuast gas from the exhaust manifold to the intake manifold;

first and second valve means including first and second butterfly valves disposed within said first and second passages respectively; and

control means responsive to engine load and operatively connected to said butterfly valves for regulating the recirculation of exhaust gas in relation to said load and including means for interconnecting said butterfly valves in opposite working relationship to effect the closing of the first butterfly valve while the second butterfly valve is being opened, said interconnecting means having a common shaft rotatably carried by said conduit means in transversely extending relation through said first and second passages thereof, and with said butterfly valves being fixedly mounted in predetermined angular relation to one another on said shaft within their respective passages.

4,020,810

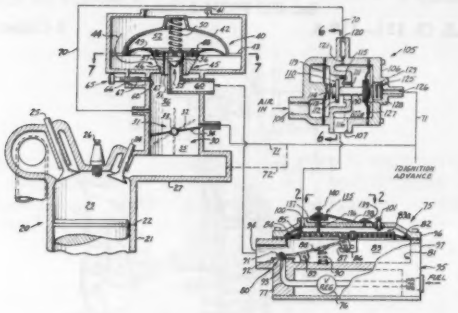
ECONOMIZER VALVE FOR USE WITH GAS-POWERED INTERNAL COMBUSTION ENGINES

Richard Baverstock, Long Beach, Calif., assignor to Impco Carburetion, Inc., Cerritos, Calif.

Filed Oct. 8, 1975, Ser. No. 620,260
Int. Cl.² F02M *21/02*
U.S. Cl. 123—120 **21 Claims**

1. An economizer valve for use with a regulator which dispenses gaseous fuel to a mixing valve in the induction system of an internal combustion engine, said induction system having a mixing valve pressure region (upstream region) located upstream from a throttle valve and a manifold pressure region (downstream region) located downstream from said throttle valve, said economizer valve tending to cause the regulator to reduce the supply of fuel relative to the air flow in the induction system when pressure from the downstream region as low as or lower than a predetermined pressure is applied thereto so as to lean the charge, and to permit the charge to remain relatively richer at other conditions, said regulator including a regulator valve, a regulator chamber, and a diaphragm dividing the regulator chamber into two separate regulator regions, the setting of the regulator valve

and the rate of flow of gas through it being determined at least in part by the pressure differential between said two regulator regions, said economizer valve comprising: a valve body with a control port for connection to that regulator region in which lesser pressure tends to close the regulator valve; an air inlet port; a spoiler valve between the air inlet port and the control



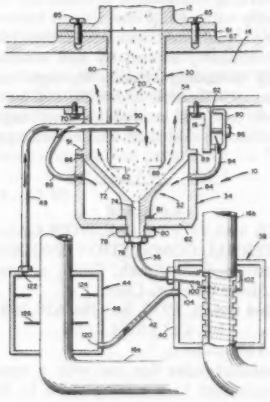
port; an air bleed port interconnecting the control port and the atmosphere for restricted flow of air to the control port; a suction port for interconnecting said upstream region and said control port; and a spoiler valve actuator including a signal port for connection to the said downstream region, sufficiently low pressure in said valve actuator from said downstream region permitting closure of the spoiler valve.

4,020,811

RECIRCULATING FUEL FEED AND VAPORIZATION APPARATUS AND METHOD

Edward P. LaForce, Huntington, Vt., assignor to Ventur-E, Inc. of Richmond, Richmond, Vt.

Filed Nov. 18, 1974, Ser. No. 524,992
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 AC **29 Claims**



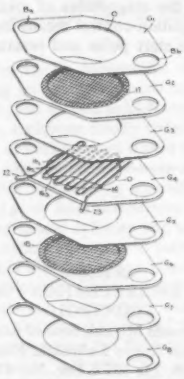
1. An apparatus for vaporizing fuel prior to introduction into the combustion chambers of an engine, in combination with said engine, the apparatus comprising: a carburetor extension for receiving the fuel-air mixture from a carburetor; separator means for separating the vaporized fuel from the fuel droplets prior to entry into the combustion chambers, said separator means including flow reversal means for diverting the flow direction of vaporized fuel by on the order of 180° while not substantially affecting the flow direction of fuel droplets; collecting means for collecting the fuel droplets, said collecting means being positioned downstream of said carburetor extension; a plurality of heater stages for heating said fuel droplets, said heater stages including at least a first heater stage positioned downstream of said carburetor extension and a second heater stage positioned downstream of said first heater stage; a first conduit for connecting said collecting means to said first heater stage for delivering fuel droplets from said collecting means to said first heater stage; a second conduit for connecting said first heater stage to said second heater stage for delivering vaporized fuel from said first to said second heater stage; and a third conduit for connecting said second heater stage to said carburetor extension for delivering reheated vaporized fuel to said carburetor extension.

4,020,812

FUEL ATOMIZING UNIT

Arthur Hayward, Bronx, N.Y., assignor to Electronic Fuel Saver, Inc., Bronx, N.Y.

Filed June 18, 1975, Ser. No. 587,846
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 F **13 Claims**



1. An atomizing unit interposable in a conduit feeding a relatively cold mixture of fuel droplets dispersed in an air stream to a combustion chamber for ignition therein, said unit comprising:

A. a pair of parallel mesh screens having an electrical heating element placed in space therebetween to define a pocket which restricts the flow of said mixture through said pocket, the restriction having an impedance to flow in the range of about 15 to 20 percent, said screens intercepting said droplets in said mixture and dissecting said droplets to develop in the output of said unit a fog-like suspension of minute particles in air; and

B. means to energize said heating element to heat said pocket to a temperature level which in free air exceeds about 500° Fahrenheit and in the presence of said mixture causes said fog to attain in said output a temperature level lying above about 90° Fahrenheit to promote vaporization thereof before it enters said combustion chamber, said unit being interposed between a carburetor to produce said cold mixture and an intake manifold leading to the cylinders of an internal combustion engine having a battery and an ignition switch, said means to energize said heating element connecting said battery to said heating element through said switch whereby said pocket proceeds to heat up in free air as soon as said switch is closed and before the cold mixture produced by the carburetor is fed through said unit into said intake manifold, thereby promoting a rapid start-up of said engine, said unit further including a heat sink to prevent excessive heating thereof

said screens and said heater element being held at spaced positions within a stack of electrically-insulating, heat-resistant gaskets having an opening therein for the passage of said mixture, said stack further including a bottom gasket formed of metal to act as said heat sink.

4,020,813
AIR-TO-FUEL RATIO CONTROL MEANS FOR CARBURETER

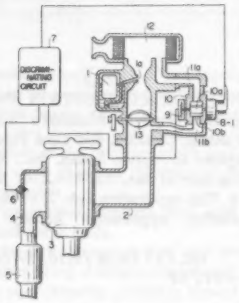
Tadashi Hattori, Nishio; Toshiharu Iwata, Okazaki, and Takamichi Nakase, Gamagori, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

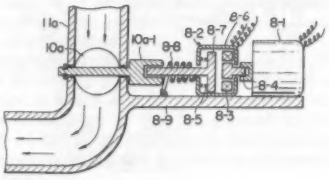
Filed June 4, 1974, Ser. No. 476,271

Claims priority, application Japan, June 5, 1973, 48-63470; Jan. 11, 1974, 49-6867

Int. Cl.² F02M *23/04*

U.S. Cl. 123—124 B **2 Claims**





1. An air-to-fuel ratio controlling system for an internal combustion engine comprising;

a carbureter connected to an intake manifold of an internal combustion engine and including a main passage and a bypass passage for supplying air-fuel mixture to said engine;

said main passage being provided with a main valve for controlling an amount of the air-fuel mixture, and said bypass passage being also provided with a bypass valve for compensating the air-to-fuel ratio of said air-fuel mixture by controlling an amount of air-flow flowing therethrough;

an air-to-fuel ratio sensing means mounted in an exhaust manifold of said engine for detecting the air-to-fuel ratio of the air-fuel mixture supplied to said engine;

an electric control circuit connected to said air-to-fuel ratio sensing means for producing an output signal in accordance with the output of said air-to-fuel sensing means;

a driving means coupled to and driving said bypass valve in response to said output signal from said electric control circuit, whereby the amount of the air-flow flowing through said bypass passage is decreased when the air-to-fuel ratio of the air-fuel mixture detected at said air-to-fuel ratio sensing means is higher than a predetermined value, and the amount of the air-flow flowing through said bypass passage is increased when the air-to-fuel ratio of the air-fuel mixture detected at said air-to-fuel ratio sensing means is lower than said predetermined value, thus to compensate the air-to-fuel ratio of the air-fuel mixture to be supplied to said engine;

an engine condition detecting means for detecting the condition of said engine and for producing an actuating signal when said engine condition of said engine is sufficient for said air-to-fuel ratio sensing means to effectively operate; and

an electric clutch means connected between said bypass valve and said driving means;

said electric clutch means including a magnetic coil connected to said engine condition detecting means which is energized by said actuating signal, to thereby permit the driving force of said driving means to transmit to said bypass valve.

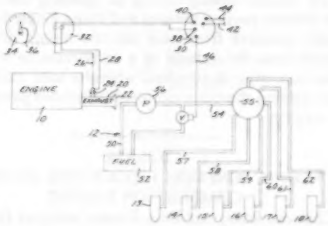
4,020,814
DIESEL ENGINE CONTROL MEANS

John T. Hewitt, 1021 Camino Real, Redondo Beach, Calif. 90277, and Peter B. J. Holtrop, 1500 Cyrene Drive, Carson, Calif. 90746

Filed May 30, 1975, Ser. No. 582,097

Int. Cl.² F02D *1/04*

U.S. Cl. 123—140 MC **10 Claims**



1. A diesel engine having multiple cylinders and fuel supply means comprising a fuel supply line, fuel pump means to produce a high pressure supply of fuel and to direct said high pressured fuel to cylinder injectors discharging directly into the multiple engine cylinders in a timed and sequential manner, and excess temperature control means having governor or fuel supply means to control the engine operation which comprises:

an engine exhaust gas temperature sensing means positioned in the engine exhaust line to generate a sensed signal responsive to the temperature of exhaust gas discharged from said engine;

control means to receive said sensed signal, compare said signal to a preset signal level corresponding to a maximum safe operational engine temperature, and to generate a control signal therefrom when said sensed signal exceeds said preset signal level;

excess temperature control means which comprises a bypass fuel line about said fuel pump means and a normally closed solonoid valve in said bypass fuel line operative in response to said control signal to divert a predetermined amount of fuel from supply to said cylinder injectors of said engine; and

means interconnecting said control means to said excess temperature control means whereby said control signal is operative to effect control of said engine in response to said control signal.

4,020,815

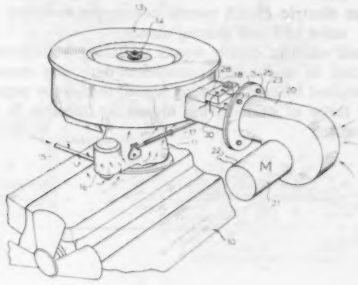
ENGINE CARBURETOR AIR INTAKE HEATER APPARATUS

Richard D. Hubert, Rte. No. 5, Box 532, DeLand, Fla. 32720

Filed May 5, 1975, Ser. No. 574,277

Int. Cl.² F02N *17/02*

U.S. Cl. 123—142.5 R **10 Claims**



1. An engine carburetor air heater apparatus comprising in combination:

a carburetor air cleaner casing adapted to fit upon and be attached to a carburetor;

electric heating means attached to said air cleaner casing for heating air passing thereby into a carburetor;

an electric motor driven blower means attached to said air cleaner for blowing air by said heating elements through said air filter into a carburetor; and

said air cleaner casing having an opening therein through the bottom portion thereof and being located to direct air under pressure from said electric motor driven blower means onto the outside of a carburetor to which the air cleaner casing is attached whereby said carburetor and fuel passing therethrough may be heated prior to starting an engine.

4,020,816

ELECTRONIC IGNITION DEVICE FOR AN INTERNAL COMBUSTION ENGINE

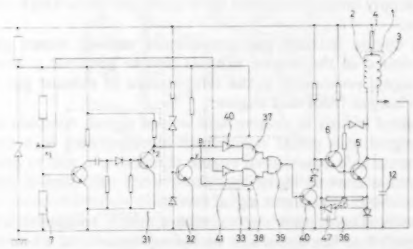
Louis Chateau, Rosny-sur-Bois, France, assignor to Ducellier et Co., Paris Cedex, France

Filed July 28, 1975, Ser. No. 599,337

Claims priority, application France, July 31, 1974, 74.26580; Feb. 24, 1975, 75.05594

Int. Cl.² F02P *1/00*

U.S. Cl. 123—148 E **3 Claims**



1. An electronic ignition device for an internal combustion engine comprising a power amplifier having an input transistor and an output transistor, a control circuit for the input transistor for rendering the output transistor alternately conductive and non-conductive, a step-up coil having a primary winding connected in series with the output transistor and a secondary winding in which a high spark inducing voltage is produced when the output transistor becomes non-conductive, overvoltage protection means operable to render the output transistor non-conductive when supply voltage is abnormally high, overriding means for overriding the protection means for a short duration in each operation of triggering means forming part of the control circuit, and a paralell diode-capacitor combination conneccted between the base of the input transistor and the emitter of the output transistor, to protect the power amplifier against high voltage reverse transients induced in the primary winding during operation of said overriding means.

4,020,817

INTERNAL COMBUSTION ENGINE

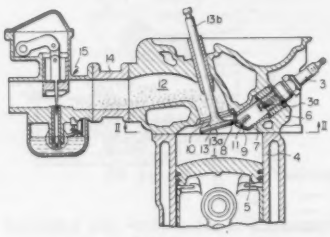
Masaaki Noguchi, Nagoya; Masaharu Sumiyoshi, Toyota; Yukiyasu Tanaka, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation-in-part of Ser. No. 434,216, Jan. 17, 1975, Pat. No. 3,974,818. This application Feb. 2, 1976, Ser. No. 654,221

Claims priority, application Japan, Sept. 1, 1975, 50-106389

Int. Cl.² F02B *19/10, 19/18*

U.S. Cl. 123—191 SP **7 Claims**

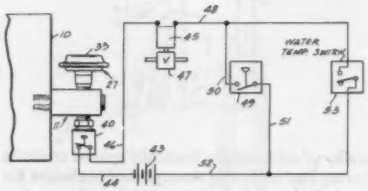


1. An internal combustion engine including: a main combustion chamber which is defined by a cylinder, a piston movably fitted in the cylinder, and a cylinder head with an intake port mounted on the cylinder; a trap chamber intercommunicating with the main combustion chamber and having a limited volume of space separated from said main combustion chamber, the trap chamber being provided with at least a suction aperture through which an air-fuel mixture is suplied into the space of said trap chamber, and at least a discharge aperture for discharging residual gas from said trap chamber into said main combustion chamber; an ignition plug having electrodes exposed to said trap chamber, and; an intake valve for closing and opening said intake port through which both said main combustion and said trap chambers are supplied with the air-fuel mixture, wherein said limited volume of space of said trap chamber is selected so as to be within a range between 0.03 and 0.13 times the total volume of said limited volume of said trap chamber and the volume of said main combustion chamber when said piston is at the top dead center; said suction aperture of said trap chamber is provided with an opening area whose size is selected so as to be within a range between 0.03 and 0.15 square centimeters per each cubic centimeter of said volume of said trap chamber, and; said discharge aperture of said trap chamber is provided with an opening area whose size is selected so as to be within a range between 0.024 and 0.12 square centimeters per each cubic centimeter of said volume of said trap chamber.

4,020,818
OIL PRESSURE DELAY CHECK VALVE AND PRESSURE SWITCH FOR SHUTTING OFF DIESEL ENGINE UPON DROP IN OIL PRESSURE

George Lesnick, South Holland, Ill., and John M. Marshall, Crown Point, Ind., assignors to Controlled Power Products Company, Oak Brook, Ill.

Filed Dec. 1, 1975, Ser. No. 636,543
Int. Cl.² F02B 77/08
U.S. Cl. 123—198 DB 10 Claims



1. In an automatic shut-off for the fuel supply to a Diesel engine upon drop in oil pressure and in combination with an engine cylinder block having an oil pressure manifold therein,

a delay check valve having communication with the oil pressure manifold in the cylinder block including a valve body having a valve chamber therein and an oil pressure inlet to said chamber,

an oil pressure passageway leading from said inlet to said chamber in said valve body,

a valve seat at the downstream end of said passageway,

said valve chamber being downstream of said valve seat,

a check valve in said chamber yieldably biased into engagement with said seat to block the flow of oil out of said chamber upon low pressure oil conditions,

a normally closed pressure switch having communication with said valve chamber and opening upon predetermined decreasing pressure conditions,

a main oil pressure switch in the oil line to the engine and normally open during operation of the engine, and closing upon decreasing oil pressures to a pressure above the pressure at which said normally closed pressure switch opens to establish an energizing circuit to shut-off the supply of fuel to the engine upon predetermined low oil pressure conditions, said normally closed pressure switch including;

an oil bleeder establishng constant communication between said valve chamber and said inlet and bleeding oil from said valve chamber when said check valve is closed to reduce the pressure in said chamber to accommodate the opening of said normally closed pressure switch in a delayed time interval and delay restarting of an unattended engine for said predetermined time delay interval.

4,020,819
VARIABLE FORCE BOW

James Ronald Haines, 1217 Tonti St., LaSalle, Ill. 61301

Filed Nov. 24, 1975, Ser. No. 634,636
Int. Cl.² F41B 5/00
U.S. Cl. 124—23 R 6 Claims

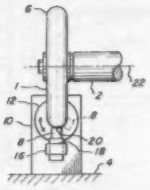
1. An archery bow for shooting arrows comprising: a handle section by which the archer holds said bow during aiming and shooting; a pair of elongated limbs each extending longitudinally away from said handle section; a pair of spaced limb tips located at the ends of said limbs farthest from said handle section; a bowstring associated with said tips in force exerting relationship to said limbs; a pair of rollers coupled to said bowstring and mounted for movement along said limbs; a pair of roller frames one carried on one of said rollers and straddling one of said limbs and the other carried on the other of said rollers and straddling the other of said limbs and said rollers having means connected to said bow limbs to permit rolling by said rollers along said bow limbs substantially the

full length of said bow limbs during the drawing of said bowstring.

4,020,820
PROCESS FOR TRUING GRINDING WHEELS

Istvan T. Kish, 16601 Excelsior Blvd., Minnetonka, Minn. 55343

Continuation-in-part of Ser. No. 452,438, March 18, 1974, Pat. No. 3,921,616. This application Nov. 24, 1975, Ser. No. 634,891
The portion of the term of this patent subsequent to Nov. 25, 1992, has been disclaimed.
Int. Cl.² B24B 53/06
U.S. Cl. 125—11 R 8 Claims



1. A process for truing a resin bonded grinding wheel having abrasive particles selected from the group consisting of diamond an boron nitride held in a bonding agent, comprising:

rotating a resin bonded grinding wheel having bonded abrasive particles selected from the group consisting of diamond and boron nitride about a rotational axis extending substantially normal to the plane of the wheel; and

simultaneously holding a tool in frictional contact with the peripheral work surface of said grinding wheel while it rotates, said tool being made from one of a group of related metal consisting of molybdenum, tantalum and columbium.

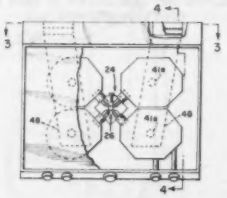
4,020,821
GAS-FIRED SMOOTH TOP RANGE

Edward A. Reid, Jr., Westerville; George W. Myler, Upper Arlington, and James E. Payne, Columbus, all of Ohio, assignors to Columbia Gas System Service Corporation, Wilmington, Del.

Continuation-in-part of Ser. No. 557,032, March 20, 1975. This application Feb. 18, 1976, Ser. No. 659,010
Int. Cl.² F24C 3/10
U.S. Cl. 126—39 E 14 Claims

1. Ignition means comprising, a pilot tube for delivering gas to an ignition zone, said pilot tube having at least one ignition port for directing a stream of gas outward of said tube; a

source of ignition positioned adjacent said port; said pilot tube also having at least one main port formed therein for directing a stream of gas toward a burner to be ignited; flame tube means for guiding said stream of gas to the burner to be ignited; said pilot tube also having at lest one pilot port formed therein between said ignition and main ports for assuring that the main port is ignited when the ignition port is ignited, and means for fixing the relationship of the flame tube to the burners to be ignited.

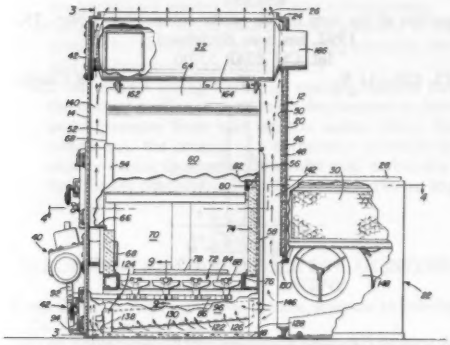


4,020,822

MULTI-FUEL FORCED AIR FURNACE

Harold F. Harris, Oneida, N.Y., assignor to Oneida Heater Company, Incorporated (Entire), Oneida, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,956
Int. Cl.² F24H 3/02
U.S. Cl. 126—110 R **21 Claims**



1. A multi-fuel heating furnace comprising, an insulating enclosure having spaced vertical walls and a base, a heat generator mounted within said enclosure in spaced relation to the vertical walls having a combustion chamber therein, a grate assembly supported within the heat generator below the combustion chamber for supporting solid fuel, fluid fuel burner means mounted on the enclosure for igniting the solid fuel on the grate assembly, heat exchanger means mounted within the enclosure above the heat generator for conducting air in heat transfer relation to combustion products from the heat generator, and blower means connected to the enclosure for inducing a forced inflow of air to the heat exchanger means.

4,020,823

HOT AIR HEATING SYSTEM

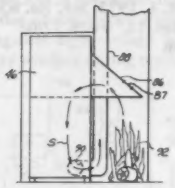
Roger J. Baumbach, 3267 Belfast, Flint, Mich. 48507

Filed Aug. 11, 1975, Ser. No. 603,714
Int. Cl.² F24B 7/04
U.S. Cl. 126—121 **4 Claims**

1. A heating system adjunct unit for the use in conjunction with a standard fireplace having a wall inset portion including a combustion chamber comprising:

an enclosure positioned forwardly of said wall inset portion proximate said chamber and having an inlet for receiving heated gas from said chamber;

an outlet further connected and constructed in said enclosure vertically and laterally spaced from said inlet in said enclosure for receiving heated gas and smoke therefrom and passing it upwardly to ambient air; and



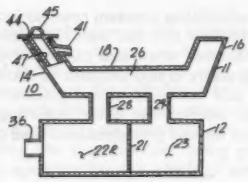
a plurality of substantially vertically spaced conduits held in an array and extending through said enclosure for receiving relatively cold air at their lower openings thereof and exhausting heated air from the upper openings thereof, said conduits held in said array and spaced one from the other to permit passage of the heated gas and smoke therebetween in its path intermediate said inlet and said outlet.

4,020,824

PORTABLE FIREPLACE GRATE HEATER

Stanton A. Dodson, South Lake Tahoe, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 21, 1975, Ser. No. 570,192
Int. Cl.² F23H 13/00
U.S. Cl. 126—164 **2 Claims**



1. A grate unit adaptable for support of burning material in a fireplace, which grate unit supplies heated air to an adjoining area, comprising

a plurality of hollow grate tubes mounted on a hollow base,

said hollow base enclosing a plurality of chambers separated by partition means with a first chamber serving as an inlet chamber and a second chamber serving as an outlet chamber,

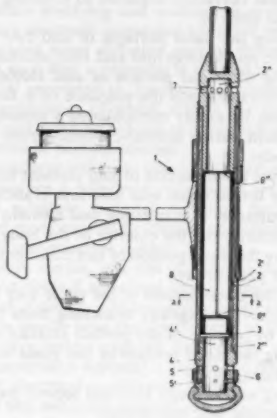
said base fitted with an inlet tube leading to the said inlet chamber and an outlet tube leading to the said outlet chamber, with

the interior of each grate tube joined to two separate chambers of the base so that a set of the said grate tubes enclose a continuous passageway joining all the chambers of the base and extending from the said inlet chamber to the said outlet chamber.

4,020,825
FISHING ROD WITH HEATED HANDLE

Federico Fusetti, Via Buonamano 12, 6612 Ascona, Switzerland

Filed Aug. 25, 1975, Ser. No. 607,618
Claims priority, application Switzerland, Sept. 12, 1974, 12460/74
Int. Cl.² A61F 7/06
U.S. Cl. 126—206 4 Claims



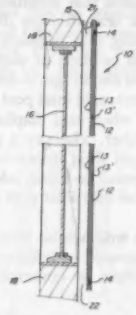
1. A fishing rod having an elongated hollow handle, a removable container in the handle, heating means in the removable container, means to close the end of the hollow handle thereby to retain the container in the handle, the handle having ventilating openings at opposite ends thereof disposed on opposite sides of said container thereby to permit air to reach the fuel, and means to adjust the total area of said openings thereby to regulate the amount of air reaching said fuel to control the heat emitted by said fuel, some of said openings being larger than others of said openings, said adjusting means comprising means movable axially of the handle to expose said larger openings in one axially adjusted position of said adjusting means and to close said larger openings and expose said other openings in another axially adjusted position of said adjusting means.

4,020,826
SOLAR ENERGY SYSTEM

Robert Alan Mole, 230 39th St., Boulder, Colo. 80303

Filed Feb. 23, 1976, Ser. No. 660,087
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 9 Claims

1. A solar energy absorption control system comprising:
pliant window drapes having a decorative side and a back side;
a pliant drape liner having first and second sides;
fastening means releasably attaching the drape liner to the backside of the window drapes;
the backside of the drapes and the first and second sides of the liner comprising at least one radiant energy reflecting surface and at least one radiant energy absorbing surface;
whereby the decorative side of the drapes may be positioned adjacent a window facing into the interior of the structure and, depending upon the season, the radiant energy reflecting surface positioned to reflect radiant energy back through the window or, alternatively, the radiant energy absorbing surface positioned to absorb

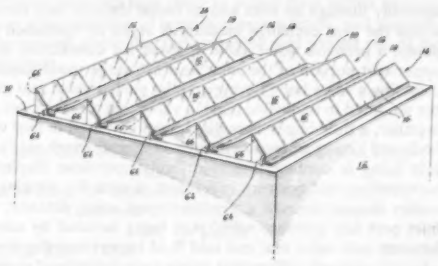


the radiant energy and provide heat energy to the interior of the structure.

4,020,827
SOLAR ENERGY COLLECTING SYSTEM

Frederick N. Broberg, Westbrook, Conn., assignor to Paul D. Harrigan, Milford; George H. Male, North Haven and Frederick N. Broberg, Westbrook, all of, Conn.

Filed Aug. 20, 1975, Ser. No. 606,103
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 12 Claims



1. A solar energy collecting system comprising:
A. stationary solar energy collector means having a radiant solar energy collecting surface mounted at an angle to the horizon and generally facing the sun's position at solar noon to receive radiant solar energy;
B. means for conveying collected energy away from said solar energy collecting surface,
C. stationary, curved reflector means also mounted at an angle to the horizon for reflecting solar energy to said collector; and
D. walkway means between said collector means and reflector means for providing drainage from and access for maintenance to both of said collector and reflector means.

4,020,828
PRESSURE RELIEF VALVE APPARATUS AND METHOD

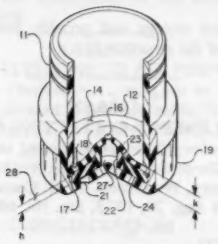
Michael Halsey Steed, East Palo Alto, Calif., assignor to Fafco Incorporated, Menlo Park, Calif.

Filed Dec. 15, 1975, Ser. No. 640,908
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 9 Claims

1. A pressure relief valve for use with a closed flow channel comprising a valve body having an inlet port therein and an open end for communication with the closed flow channel, a

fluid impervious diaphragm having a pressure relief port therein and a predetermined surface area, means for securing the periphery of said fluid impervious diaphragm axially in said valve body, a valve seat member mounted in said valve body having a valve seat thereon disposed to contact said diaphragm surrounding said pressure relief port, and means for locating the axial position of said means for securing so that the center of said diaphragm is deflected through a predetermined axial distance, said inlet port being isolated from said pressure relief port when said diaphragm is in contact with said valve seat member, whereby a predetermined pressure differential across said fluid impervious diaphragm with the higher pressure disposed to cause additional axial deflection thereof communicates said inlet port with said pressure relief port.

6. In combination with a solar heat exchange panel assembly located in an elevated position relative to a reservoir of heat exchange medium in communication with the panel



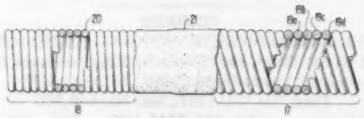
assembly through an inlet and an outlet therefor and through which the heat exchange medium is urged by operation of a pump, a pressure relief valve adapted for connection to an uppermost portion of the solar heat exchange panel assembly including a valve body having an inlet port, a valve seat member mounted in said valve body, a valve seat on said valve seat member, a fluid impervious diaphragm mounted in said valve body and having a pressure relief port therethrough,said valve seat being in contact with said fluid impervious diaphragm surrounding said pressure relief port, means for locating the center thereof through a predetermined axial distance, said inlet port and pressure relief port being isolated by contact between said valve seat and said fluid impervious diaphragm, whereby pressure differential above a predetermined pressure differential across said fluid impervious diaphragm urges additional deflection at the center thereof, thereby communicating said inlet and pressure relief ports and allowing heat exchange medium to drain from the solar heat exchange panel assembly back into the reservoir when pressure drops in said panel.

4,020,829

SPRING GUIDE WIRE WITH TORQUE CONTROL FOR CATHETERIZATION OF BLOOD VESSELS AND METHOD OF USING SAME

James K. V. Willson, and Marshall Eskridge, both of P.O. Box 2144, Mobile, Ala. 36601

Filed Oct. 23, 1975, Ser. No. 625,073
Int. Cl.[2] A61B *10/00*; A61M *25/00*
U.S. Cl. 128—2 M 15 Claims



1. Method for introducing fluid into a remote internal body passageway from a first internal organ from which said passageway is successively angularly branched utilizing two separate elongated elements, one of said two elements being a flexible, wholly non-metallic, hollow catheter, the other of said two elements comprising a flexible guide wire means having a helically wound single layer multi-wire coil capable of transmitting rotational torque at a one-to-one ratio along a first major portion of its length, the distal portion comprising a single wire helical coil having primarily flexibility in bending and capable of transmitting torque only in an axial compressional direction, the distal portion of one of said two elements having a normal curvature imparted to it during fabrication, comprising the steps of:

a. introducing the distal portions of said two elements in concentric relationship into said first internal organ;
b. advancing the distal portion of said element having a normal curvature into the entrance of a first branched passageway by axially manipulating a remote portion of said element having normal curvature from the exterior of the body;
c. rotating the distal portion of said element having normal curvature for entrance into said first branched passageway by rotatably manipulating said element having normal curvature from the exterior of the body;
d. advancing the distal portion of said catheter into said first branched passageway;
e. rotating the distal portion of the guide wire for entrance into a second passageway branching from the first passageway by rotation of the portion exterior of the body;
f. advancing the distal portion of the guide wire into said second passageway;
g. advancing said catheter into said second passageway;
h. removing said wire coil means;
i. introducing said fluid into said catheter.

14. A guide implement for use in catheterizing various organs of the body, including veins, bronchial tree, intestinal tract and similar medical procedures comprising:

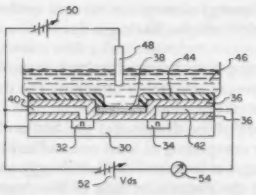
a. an elongated first helix composed of a plurality of metal spring wires laid in parallel contiguous relationship to each other throughout their lengths, each turn of each wire being of the same uniform diameter and the exterior of the helix being smooth along its length;
b. and a second helix having a uniform diameter composed of a single metal spring wire, the cross-section of said single wire being uniform throughout its length, said second helix having a normal longitudinal curvature imparted to it during fabrication;
c. one end of the second helix being joined to the first helix in alignment thereto, whereby the radial direction of curvature of the second helix can be accurately controlled by rotation of the first helix from outside the body.

4,020,830

SELECTIVE CHEMICAL SENSITIVE FET TRANSDUCERS

Curtis C. Johnson, Sandy; Stanley D. Moss, Kaysville, and Jiri A. Janata, Salt Lake City, all of Utah, assignors to The University of Utah, Salt Lake City, Utah

Filed Mar. 12, 1975, Ser. No. 557,545
Int. Cl.[2] A61B *5/05*; G01N *27/46*, *31/14*
U.S. Cl. 128—2 E 27 Claims



1. A chemical sensitive field-effect transistor transducer

unit for detecting chemical properties of substances to which the unit is exposed and including a transducer which comprises:

a semi-conductor substrate having a doping polarity,

a pair of spaced apart diffusion regions located at the surface of said substrate material,

an electrical insulator material overlying at least a portion of said diffusion regions and the surface of the substrate material lying between the diffusion regions,

a chemical selective system containing a chemical selective membrane overlying said insulator material, and

a reference electrode connected to circuit relationship with said spaced apart diffusion regions through a potential source such that a potential is created and added to the potential generated in the chemical selective membrane the combination of which affects the conductivity between said diffusion regions as a measure of the chemical properties of said substances.

11. A transducer unit as in claim **1** wherein said transducer further comprises a substance impervious material disposed about said substrate material, diffusion regions, insulator material and membrane and including an opening for exposing a portion of said selective system.

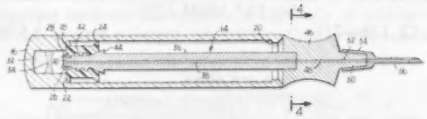
12. A hollow needle, one end of which is tapered to facilitate insertion thereof in animal tissue comprising the transducer unit of claim **11**, said transducer unit being fixed in the lumen of the needle near the tapered end so that the portion of the selective system exposed through the opening in the substance impervious material is exposed to fluid entering the lumen, and electrical conductors coupled to said diffusion regions and said substrate material and extending through the substance impervious material and through the lumen of the needle toward the end opposite the tapered end.

4,020,831

BLOOD COLLECTING SYRINGE

Stanford L. Adler, Monsey, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,506
Int. Cl.² A61B *5/14*
U.S. Cl. 128—2 F **10 Claims**



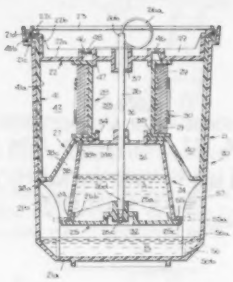
1. An article for drawing a blood specimen, comprising: a specimen-receiving tube having a closed end and an open end, a resilient expandable plug receivable in said tube, said plug being in normally unexpanded light sealing contact with the side wall structure of said tube, a cannula, an elongated cannula holder having a through longitudinal passageway for communication with the interior of the cannula, said plug and said holder having coacting means releasably coupling said plug and said holder with said passageway in communication with said closed end portion of said tube, said holder expanding said plug into firm sealing contact with the side wall of the tube, and inwardly extending lower and upper members adjacent said lower and upper ends, respectively, of said tube for contacting the lower and upper surfaces of said plug during the coupling and decoupling, respectively, of said plug and said holder.

4,020,832

PACKAGE AND METHOD FOR PREPARING ORTHOPEDIC CAST-MAKING MATERIALS

Harold B. Kirkpatrick, Easton, Conn.; Edward C. Distler, Warminster, Pa., and Marvin Menzin, Lexington, Mass., assignors to Reichhold Chemicals, Inc., White Plains, N.Y.

Filed Dec. 24, 1974, Ser. No. 536,254
Int. Cl.² A61F *5/04*
U.S. Cl. 128—90 **30 Claims**



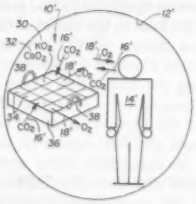
1. A method of preparing a length of tape for application to a body member to form an orthopedic cast thereon, comprising the steps of mixing reactant resin-forming materials together in liquid form to initiate curing thereof, wetting the tape substantially uniformly along its length with the curing liquid and removing any excess liquid from the tape, at least said steps of wetting said tape and removing any excess liquid therefrom being performed within a substantially enclosed container and said tape being in rolled form within said container after said step of removing excess liquid, and thereafter opening said container and removing said wetted roll of tape therefrom.

4,020,833

OXYGEN SOURCE FOR HUMAN RESPIRATION REQUIREMENTS

Harold Rind, 46 Southwood Circle, Syosset, N.Y. 11791

Filed June 21, 1976, Ser. No. 697,824
Int. Cl.² A62B *7/00*
U.S. Cl. 128—142 R **6 Claims**



1. A chemical mixture serving as an improved oxygen source to support human respiration needs for use in an environment without adequate oxygen, said mixture comprising in a prescribed ratio of a predominant amount of a metallic superoxide in particulate form which releases oxygen upon impingement thereon of carbon dioxide and water vapor, and a remaining amount of a chemical also in a particulate form and in a physically intermixed relation to said metallic superoxide, said chemical being of the type which is effective to absorb carbon dioxide without any significant production of oxygen, said prescribed ratio being related to the respiration quotient of the user of said oxygen source and of a selected value wherein said metallic supperoxide is approximately 90% of said mixture, whereby the volume of oxygen produced for consumption is of a selected amount that is less than that

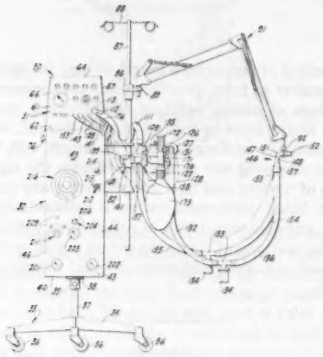
which is produced by a pure metallic superoxide and yet still is responsive to the volume of carbon dioxide and water vapor exhaled by the user and impinging upon said metallic superoxide to cause the release of oxygen therefrom.

4,020,834

RESPIRATOR AND METHOD

Forrest M. Bird, 212 NW. Cerritos, Palm Springs, Calif. 92262

Filed May 16, 1975, Ser. No. 578,170
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.6 **32 Claims**



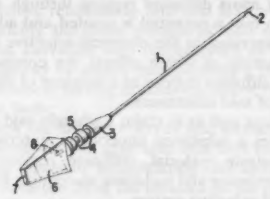
1. In a respirator having an inhalation phase and an exhalation phase in its operative cycle, an inlet adapted to be connected to a source of gas under pressure, first and second outlets, a sequencing servo having an inlet connected to the inlet of the respirator, said sequencing servo also having an outlet, control valve means disposed in said sequencing servo and movable between open and closed positions to control the flow of gas from the inlet to the outlet of the sequencing servo, said control valve means being in an open or on position during the inhalation phase of the respirator and in a closed or off position during the exhalation phase of the respirator, a patient adapter, means for connecting the outlet of the sequencing servo to the first outlet of the respirator, means for supplying gas from the first outlet of the respirator to the patient adapter, an exhalation valve assembly connected to the patient adapter and movable between open and closed positions and in the open position permitting gases to flow from the patient adapter and in the closed position preventing the flow of gases from the patient adapter, means for supplying gas from the inlet of the respirator to the second outlet of the respirator, means for supplying gas from the second outlet of the respirator to the exhalation valve assembly to maintain the exhalation valve assembly in a closed position during the inhalation phase, means for sensing the pressure of the gas in the first outlet and for switching the sequencing servo from an open position to a closed position when a predetermined pressure is reached in the first outlet, means connected to the exhalation valve means for establishing a positive pressure against which the patient must exhale during the exhalation phase and means for terminating the application of positive pressure to the exhalation valve assembly near the end of the exhalation phase so that the patient is exposed to ambient pressure prior to initiation of the inhalation phase.

4,020,835

CATHETER PLACEMENT ASSEMBLY

Cai Gustav Rabbe Nordström, Munich, and Peter Veerhoff, Bingen (Rhine), both of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 497,701, Aug. 15, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,267
Claims priority, application Germany, Feb. 12, 1975, 2505790; Aug. 16, 1973, 2341297; Nov. 28, 1973, 2359134
Int. Cl.² A61M *5/00*
U.S. Cl. 128—214.4 **27 Claims**



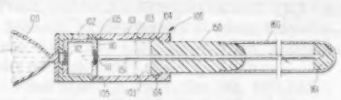
1. In a vein catheter placement assembly comprising a flexible catheter having a forward end and a rearward end and a puncture needle unit longitudinally slidably positioned within said catheter; said puncture needle unit comprising a hollow tubular puncture needle having a pointed forward end and a rearward end and being open at both ends, said pointed forward end protruding beyond the forward end of the catheter and the rearward end of the puncture needle protruding beyond the rearward end of the catheter, and a finger-grip attached to the rearward end of the puncture needle; the improvement which resides in that said fingergrip extends laterally from the rearward end of said puncture needle in a finger-grip plane which is at an angle substantially intermediate that of 45 to 90° with respect to the needle plane defined by the longitudinal axis of the puncture needle and the point of the puncture needle, and said finger-grip comprising a pair of exterior concave surfaces substantially symmetrically disposed with respect to said finger-grip plane.

4,020,836

APPARATUS FOR MEDICAL INJECTIONS

James Robert Cunningham, USAF Hospital, PACAF, Box 4363, APO San Francisco, Calif. 96323

Continuation-in-part of Ser. No. 577,324, May 14, 1975, and a continuation-in-part of Ser. No. 577,322, May 14, 1975, abandoned. This application Oct. 23, 1975, Ser. No. 625,171
Int. Cl.² A61M *5/00*
U.S. Cl. 128—216 **1 Claim**



1. A syringe for medical injectibles comprising:
a flexible container to maintain the injectibles prior to injection into a patient;
a needle housing assembly maintained in fixed relation to the container;
a sealed chamber within the needle housing;
an injection needle having an interior cavity, a first end adapted to be inserted into a patient, and a second end adapted to pierce a sealable orifice, slideably disposed on a needle carrier assembly within said needle housing;
a first sealable orifice to allow communication between the interior cavity of the injection needle and the container when the second end of the injection needle is within the container;

a second sealable orifice to allow communication between the interior cavity of the injection needle and the sealed chamber when the second end of the injection needle is within the sealed chamber;

a first frictional stop to hold the injection needle in a first initial position for insertion into a patient in such a manner that the second end of the injection needle is not within the container or the sealed chamber;

a second frictional stop to hold the injection needle in a second position wherein the second end of the injection needle is within the sealed chamber.

4,020,837

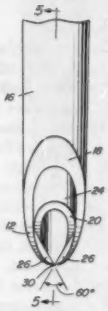
HOLLOW PIERCING TIP FOR VIAL STOPPERS

Roger R. Larson, Champaign, Ill., assignor to Pharmaco, Inc. (Entire), Champaign, Ill.

Filed Nov. 4, 1975, Ser. No. 628,741

Int. Cl.² A61M 5/32

U.S. Cl. 128—218 N **6 Claims**



1. A needle structure for piercing the resilient stopper of a medicament vial or the like, said structure including an elongated tubular body constructed of stiff, but bendable plastic having a first large diameter supportive end and a second diametrically reduced needle extension defining end, said second end including a central longitudinal small diameter bore extending therethrough, the free end of said second end including at least one beveled end face through which said bore opens and which extends continuously about said bore on opposite sides of a narrow radial zone of said extension at the outermost extremity of said beveled end face extending between the outer surface of the corresponding peripheral portion of said extension and the adjacent peripheral portion of said bore, said radial zone being defined by a blunt radial ridge having its apex facing outwardly of said free end and formed between oppositely beveled surfaces of said extension extending between said outermost extremity of said beveled end face and the adjacent outer side surface of said extension.

4,020,838

ANIMAL DOSING SYRINGE

Ian Ross Phillips, Pymble, and Mervyn Frank Reynolds, Dee Why, both of Australia, assignors to N.J. Phillips Pty. Limited, Dee Why, Australia

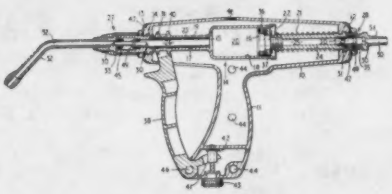
Filed Apr. 20, 1976, Ser. No. 678,578

Claims priority, application Australia, May 6, 1975, 1498

Int. Cl.² A61D 7/00

U.S. Cl. 128—223 **9 Claims**

1. A liquid dispensing gun having an outer body with a liquid inlet and outlet fixed thereto and which ejects a dosage of liquid drawn from a reservoir; said gun comprising a first and second chamber defined in part respectively by a first and second interacting bore and piston; the second bore being larger in diameter than, coaxial with, and fixed to, the first bore; the pistons being stationary relative to the body but movable within their respective bores to vary the volume of the chambers; means allowing the flow of liquid between the chambers; first ducting means joining the liquid inlet with the chambers and including a passage through one of the pistons; second ducting means joining the liquid outlet with the chambers and including a passage through the other piston; a one-way valve in each of the ducting means restricting the liquid to flow in only one direction through the gun; and means for moving the bores relative to the pistons to thereby cause a



decrease in the total volume of the chambers and the ejection of liquid from within the chambers via said liquid outlet and second ducting means, or an increase in the total volume of the chambers and the drawing in of liquid from the reservoir via said first ducting means and liquid inlet.

4,020,839

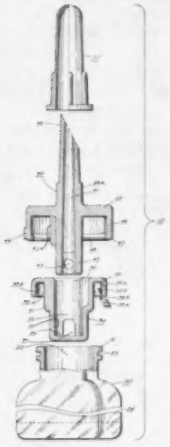
MEDICAMENT-DISPENSING PACKAGE

Steven Michael Klapp, St. Clair Shores, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Feb. 26, 1976, Ser. No. 661,664

Int. Cl.² A01M 5/34

U.S. Cl. 128—272 **7 Claims**



1. A medicament-dispensing package for use with a parenteral solution container comprising

a medicament container having an open mouth,

a closure including a skirt in locking engagement with said container, the closure being in sealing relation with the mouth and including an axial recessed tubular transfer chamber having a distal end extending within said mouth in the sealing relation, the distal end having a first off-center access opening communicating with the interior of the medicament chamber,

and an open-ended transfer tube having a spike end and an opposite loading end, the loading end having a second off-center access opening and being joinable in telescopic relation with the transfer chamber and rotatable therewith in joined relation to and from a dispensing position in which said first and second access openings are in alignment for transfer of liquid and/or solid to and from the container by way of transfer tube, the transfer tube

being detachable in telescopic relation from the transfer chamber such that after dispensing contents of said medicament container to a parenteral solution container by means of the spike end, the transfer tube can be telescopically disconnected from the closure.

4,020,840

DEVICE FOR CATHETERIZING THE BLADDER

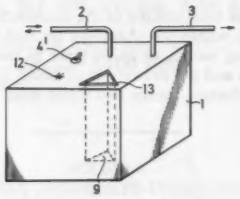
Shafik Barsom, Hannover, Germany, assignor to Richard Wolf GmbH, Knittlingen, Germany

Filed Sept. 15, 1975, Ser. No. 613,065

Claims priority, application Germany, Sept. 18, 1974, 2444602

Int. Cl.² A61M *1/00*

U.S. Cl. 128—276 **7 Claims**



1. A device for catheterising the human bladder comprising catheter conduit means and pump means through which the flow direction of transported fluid is reversible in both means, a first pump connection connecting the pump means to the catheter means, valve means, a second pump connection connecting the pump means to the valve means, a bladder discharge means, a return conduit means for communicating with a liquid container containing a liquid to be returned to the bladder, said valve means being operable to selectively arrange communication between said second pump connection on the one hand and one of the discharge means and return conduit means on the other hand in dependence on the delivery direction of the pump.

4,020,841

CATAMENIAL TAMPON

Richard P. Poncy; Mark P. Poncy; George W. Poncy, Sr.; George W. Poncy, Jr., and Robert C. Brandriff, all of 3670 E. Indus. Way., Riviera Beach, Fla. 33404

Filed June 17, 1975, Ser. No. 587,676

Int. Cl.² A61F *13/20*

U.S. Cl. 128—285 **9 Claims**

1. A catamenial tampon comprising:

an elongated core of relatively non-compressible, highly absorbent fibrous material; and

an outer sheath of non-absorbent, resilient closed cell foam enclosing said core along the sides and at one end thereof, said core being exposed only at the opposite end from said one end through a opening in said sheath;

the outer sheath having an exterior configuration and size to fit within the human vagina.

4,020,842

LINERLESS, RECLOSABLE TAB STOCK

Edward B. Richman, Shaker Heights; Seymour W. Tomlinson, Perry; Suzette Nemeth, Painesville, and David W. Wilson, Mentor, all of Ohio, assignors to Avery International Corporation, San Marino, Calif.

Filed Oct. 23, 1975, Ser. No. 624,870

Int. Cl.² A41B *13/02*; B32B *3/04*

U.S. Cl. 128—287 **10 Claims**

1. A diaper having a reclosable diaper tab formed of diaper tab stock comprising a web construction of linerless reclosable diaper tab stock made up of initially flat but flexible layers suitable to be formed in long passes along the machine direction of a coating and laminating line and to be rolled up for storage and shipment, and unrolled for use by diaper manufacturers, and fabricatable completely by web coating, slitting and web-to-web laminating operations and without the necessity for folding operations, and suitable for high speed dispensing on automatic equipment, including a first substrate bearing first substrate adhesive on its underside, and extending, transversely to machine direction, along first and second length portions, a second substrate bearing second substrate adhesive on its underside and extending along said first and second length portions, first substrate release coat means below said first substrate adhesive and associated with said second substrate, a third substrate bearing a third substrate adhesive on its underside, second substrate release coat means below said second substrate adhesive and associated with said third substrate at said first length portion and patterened to extend substantially only along said first length portion and substantially none into said second length portion, said second substrate being slit or divided along the machine direction in the region of adjacency of said first and second length portions.

4,020,843

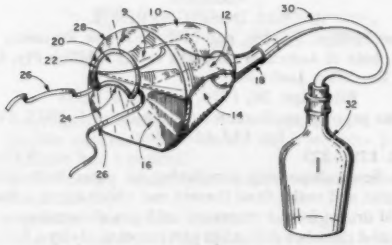
MALE EXTERNAL URINARY CATHETER

Leone Kanall, 49 Payson St., Winthrop, Mass. 02152

Filed Jan. 12, 1976, Ser. No. 648,530

Int. Cl.² A61F *5/44*

U.S. Cl. 128—295 **8 Claims**



1. A male external urinary catheter comprising:

a truncated sheath member having on one end an opening through which a penis is adapted to be inserted, said opening being capable of encompassing the base of the penis;

an elongated casing, affixed about the perimeter of the other end of said sheath member, said casing having a large opening in the upper portion thereof in the end adjacent said sheath member to receive the penis therethrough;

a platform intermediately disposed within said casing, and positioned in alignment with the lower extent of said upper casing portion opening, upon which said penis is adapted to rest after insertion said platform acting to further partition an enclosed lower well compartment within said casing, said platform having a series of drainage openings between itself and the casing sides;

a funnel member affixed to an aperture within the base of said lower well compartment; and

means for affixing said catheter to the body of the patient.

4,020,844

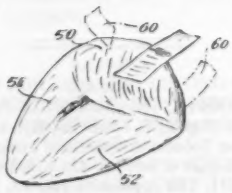
THROAT PACK

Ian Malcolm Vickery, 37 Kewstoke Road, Stoke Bishop, Bristol, 9, England

Division of Ser. No. 551,714, Feb. 21, 1975, Pat. No. 3,983,877. This application Mar. 31, 1976, Ser. No. 672,151

Int. Cl.² A61B *17/24*

U.S. Cl. 128—303 R **6 Claims**



1. A laryngo-pharyngeal throat pack having an anterior portion for occluding under compression the laryngo-pharyngeal passage, and a generally tapering posterior portion, the occluding section having a smoothly convex superior, posterior and lateral surface merging with a generally flat interior surface, the inferior surface tapering rearwardly to have a generally triangular outline, the superior, posterior and lateral surface sloping rearwardly to merge with the inferior surface providing a semi-conical tapering shape to the pack rearwardly of the occluding section.

4,020,845

Patent Not Issued For This Number

4,020,846

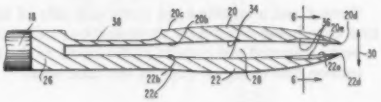
SPLINTER PULLER

Henry W. Stokes, 9 Martin's Cove Lane, Hingham, Mass. 02043

Filed Sept. 26, 1975, Ser. No. 617,043

Int. Cl.² A61B *17/32, 17/28*

U.S. Cl. 128—305 **4 Claims**



1. An instrument for removing a splinter embedded in skin comprising,

a handle extending in a first direction,

a pair of pincers secured at one end to one end of said handle and spaced in a second direction transverse to said first direction, said pincers being substantially broader in a third direction orthogonal to said first and second direction than in said second direction, and tapering convexly at their free ends in said second and third directions to tips, said tapering defining a leading edge adjacent each of said tips that are opposed to one another, said pincers being movable with respect to one another generally in the second direction to grip said splinter between said opposed leading edges, and said leading edges being sharpened to slice the skin in a direction generally normal to the sharpened leading edge in response to movement of the instrument in a direction at least in part parallel to said sharpened leading edges, said slicing facilitating the entry of the instrument into the skin to reach said splinter,

the interior mutually facing surfaces of said free ends adjacent said leading edges being hollow to prevent contact between the pincers over said surfaces from blocking said gripping at said leading edges, and said hollows and said convex tapering of said free ends being structured to prevent the skin adjacent said splinter from blocking said gripping at said leading edges.

4,020,847

ROTATING CUTTER CATHETER

William T. Clark, III, 6 Davis Blvd., New Orleans, La. 70121

Filed Nov. 5, 1975, Ser. No. 628,980

Int. Cl.² A61B *17/32*

U.S. Cl. 128—305 **2 Claims**

1. A catheter comprising

a flexible shaft,

an elongate hollow tube formed by a concavo-convex wall having one end attached to said shaft and the other end being blunt,

said tube having at least one lengthwise slot in the wall

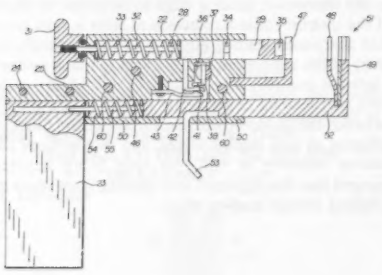
thereof and a cutting edge along one side of said slot, said tube being of circular cross-section, said cutting edge being disposed not outside of the circle of the tube cross section and being an edge of the tube wall.

4,020,848

EAR LOBE PIERCING APPARATUS

Tripoli Joseph DiCicco, 79 Wilson Road, Concord, Mass. 01742

Filed July 25, 1973, Ser. No. 382,567
Int. Cl.² A61B *17/34*
U.S. Cl. 128—330 **22 Claims**



1. Apparatus for simultaneously piercing an ear lobe and engaging therein a two-piece ear ornament comprising a headed wire and a nut for engaging said wire, said apparatus comprising:

A. first jaw means for releasably holding a nut therein,

B. second jaw means apertured to provide passage of a headed wire therethrough and mounted for movement relative to said first jaw means to secure an ear lobe therebetween prior to piercing.

C. plunger means on said second jaw means actuatable independently of said first and second jaw means and adapted to hold a headed wire in alignment with said nut and the aperture in said second jaw, and

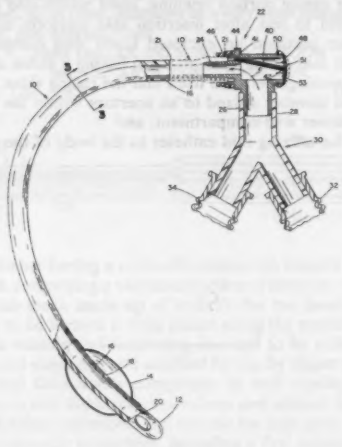
D. triggered motive means for driving said plunger means toward said first jaw means to thereby drive a headed wire positioned in said plunger means through said ear lobe and into said nut when said jaw means are moved toward each other.

4,020,849

CUFF INFLATION FOR TRACHEAL TUBES

Richard R. Jackson, Eight Trinity Road, Marblehead, Mass. 01947

Filed Dec. 1, 1975, Ser. No. 636,691
Int. Cl.² A61M *25/00*
U.S. Cl. 128—351 **16 Claims**



1. In a tracheal tube assembly comprising a breathing tube for insertion into the trachea, an inflatable cuff surrounding the tube to form a seal with the walls of the trachea, an inflation passage for admitting inflation air to the cuff, and a connector member in the connecting flow path for breathing air between a source of periodically pressurized breathing air and the proximal end of said breathing tube, the improvement wherein an auxiliary passage is incorporated in said connector member and has an entrance device exposed to the pressure of said breathing air in said connecting flow path, said entrance device incorporating a movable element responsive to raised pressure of said breathing air to move to a position to admit pressurized breathing air directly into said auxiliary passage, and responsive to decreased pressure to move to a position to seal said auxiliary passage from said breathing air, said auxiliary passage connected to said inflation passage, said passages cooperatively sized to transmit air at breathing pressure from said breathing air source during the inspiration phase to inflate said cuff.

4,020,850

THERMOPLASTIC CIGARETTE WRAPPER

Philip Hancock Cogbill, II, Louisville, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Continuation-in-part of Ser. No. 426,677, Dec. 12, 1973, Pat. No. 3,908,671. This application July 17, 1975, Ser. No. 596,850
The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.
Int. Cl.² A24D *1/02*
U.S. Cl. 131—15 R **26 Claims**

1. A thin, microporous cigarette wrapper sheet having a porosity of between about 5–60 Greiner and in which at least 50 percent of the pores of said sheet have a diameter of no more than 3 microns, said sheet comprising:

a. about 10 percent to about 45 percent by weight finely divided unfilled paper having a size of 140 mesh or less;

b. about 1.5 percent to about 2.8 percent by weight potassium nitrate;

c. up to about 40 percent by weight of a whitener; and

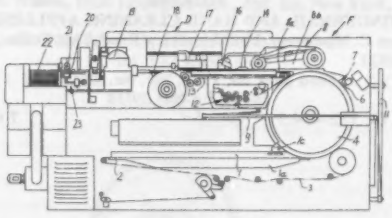
d. about 20 percent to about 55 percent by weight of a

thermoplastic binder selected from the group consisting of cellulose esters, cellulose ethers, and mixtures thereof.

4,020,851
APPARATUS FOR MONITORING THE OPERATION OF CIGARETTE MAKING MACHINES OR THE LIKE

Andreas Schloesser, and Gerhard Ramsch, both of Hamburg, Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed June 14, 1976, Ser. No. 695,843
Claims priority, application Germany, June 19, 1975, 2527329
Int. Cl.² A24B 7/14; A24C 5/32
U.S. Cl. 131—21 B **12 Claims**



1. In a machine for the production and/or processing of rod-shaped articles, particularly articles which constitute or form part of smokers' products, a combination comprising means for transporting a normally continuous file of rod-shaped articles lengthwise into a first portion of an elongated path; means for moving successive articles of said file away from the next-following articles in a second portion of said path so that neighboring articles of said file are spaced apart from each other not later than in said second portion of said path; means for conveying discrete streams of a gaseous testing fluid across said second portion of said path, including two nozzles spaced apart from each other, as considered in the direction of lengthwise movement of articles along said path, at least one of said nozzles being at least partially sealed by articles in said second portion of said path as long as said transporting means feeds a continuous file of articles into said path; conduit means communicating with said nozzles so that the pressure of testing fluid therein depends on the number of nozzles which are sealed by articles in said path; and means for monitoring the pressure in said conduit means, including means for producing a signal when the pressure of fluid in said conduit means corresponds to that at which neither of said nozzles is sealed by articles.

4,020,852
APPARATUS FOR APPLYING UNITING BANDS TO CO-AXIAL ROD-SHAPED ARTICLES

Max Norris Baker, Rural Hall, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed July 7, 1976, Ser. No. 703,155
Int. Cl.² A24C 5/48
U.S. Cl. 131—94 **1 Claim**

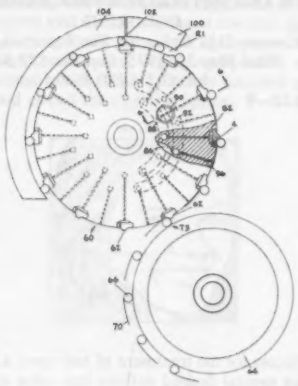
1. An improved apparatus for applying uniting bands around successive groups of co-axial rod-shaped articles comprising:

a. a rolling drum having a plurality of successive raised pockets equally spaced around the peripheral surface of the drum and parallel to the axis of the drum;

b. drive means for rotating said rolling drum;

c. a transfer drum for supplying to the rolling drum at a selected transfer point assemblies of co-axial articles and uniting bands in a pre-determined position on the rear side of the raised pockets;

d. a second roll surface spaced a selected distance in the direction of the rolling drum rotation from the transfer point to permit bad work to be purged from the drum, said second roll surface being positioned adjacent the rolling drum surface to provide a gap slightly less than the diameter of the rods to cause the assemblies to roll in a direction opposite the direction of rotation of the rolling drum to thereby convolute the uniting bands around the respective articles, the sizes of said gap being sufficient to permit said raised pockets to pass, said second roll surface being of such length that the assemblies will roll only one revolution and move between the rear side of one raised pocket to the forward side of the trailing raised pocket;



e. suction ducts in the rear side of said raised pockets.

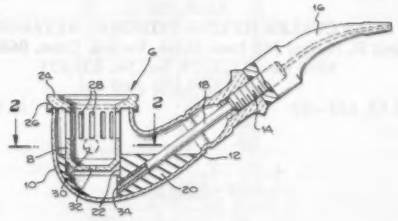
f. means for applying a vacuum to said suction ducts from the transfer point to the beginning of said second roll surface; and

g. a rail circumscribing the rolling drum from the end of the second roll surface to an exit point, said rail holding the assembled groups on the rolling drum.

4,020,853
SMOKING PIPE

Richard T. Nuttall, 15088 Sandrock Drive, Lake Hughes, Calif. 93532

Filed Oct. 2, 1975, Ser. No. 619,015
Int. Cl.² A24F 1/22, 13/04
U.S. Cl. 131—195 **13 Claims**



1. In a smoking pipe, a body having a bowl portion and a stem portion,

the bowl portion having a side wall, an open top and a bottom,

the side wall having air inlet means about the upper portion thereof,

the lower portion of the side wall being substantially continuous and free of openings,

said bowl bottom having a smoke outlet,

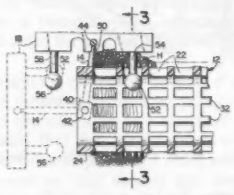
an outer wall spaced about said side wall and bottom and

having an air inlet therein engagable by a finger of the user to totally close said side wall air inlet at will,
a flow passage from said smoke outlet to said stem,
and a portion of flow passage comprising a flow barrier between said air inlet means of the side wall and said smoke outlet.

4,020,854
DEVICE AND METHOD FOR PROGRAMMED HAIR COLORING
Lorenzo Caruso, 2187 Union St., San Francisco, Calif. 94123
Filed May 21, 1975, Ser. No. 579,386
Int. Cl.² A45D *8/40*
U.S. Cl. 132—9 **2 Claims**

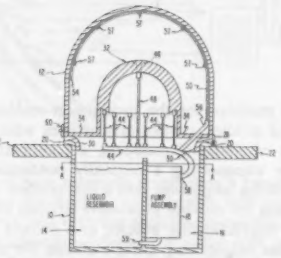
1. A process for the treatment of hair upon a person's head to produce several desired definite hair color styles in accordance with a predetermined program by applying upon the head of the person a cap having a plurality of holes therethrough;
said holes being 420 in number and having an identifying specific color adjacent to each hole in predetermined arrangement;
said specific hole colors being six in number, 20 being black, 40 being blue, 60 being orange, 80 being purple, 100 being green and 120 being red;
said program comprising an illustration of each of said desired hair color styles, each style being associated with one of said identifying hole colors;
extracting strands of hair through all of the holes having the identifying color associated with said desired hair color style;
treating said strands so extracted with suitable coloring means;
removing said cap from said head of said person whereby six different hair color styles are produced.

4,020,855
HAIR CURLER HAVING INTEGRAL RETAINER
Robert H. Phelps, 205 Irene Drive, Vernon, Conn. 06066
Filed Nov. 13, 1975, Ser. No. 631,671
Int. Cl.² A45D *2/00*
U.S. Cl. 132—40 **11 Claims**



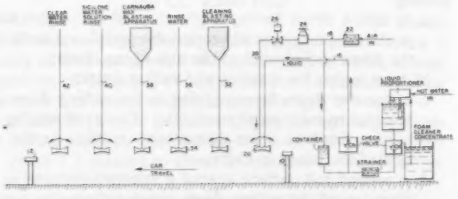
1. A hair curler comprising:
a hollow perforated cylindrical body onto which a tress of hair is rolled between opposite axial ends of the body;
a bail pivotally connected to one end of the perforated cylindrical body for swivelling movement between a first position extending axially of said one end and a second position projecting in angularly disposed relationship to the axis of the body;
a retaining arm pivotally mounted on the bail at one end of the cylindrical body for tilting or rocking motion on the bail, the arm being tiltable relative to the bail to assume a position extending from the bail and over the perforated cylindrical body in offset relation to the longitudinal axis of the body when the bail is in the second position to capture a tress of hair rolled onto the body between the body and the retaining arm; and
means for holding the retaining arm over the perforated cylindrical body generally parallel to the axis of the body to retain the captured tress of hair around the body.

4,020,856
FINGERNAIL AND HAND CLEANING APPLIANCE
Albert C. Masterson, 1048 Montview Road, Fort Collins, Colo. 80521
Filed June 28, 1976, Ser. No. 700,091
Int. Cl.² A45D *29/18*
U.S. Cl. 132—74.5 **7 Claims**



1. A fingernail and hand hygiene appliance comprising:
a housing including a port through which the user's hand may be inserted;
a hand rest mounted within the housing, said hand rest including a plurality of finger receptacles for receiving the fingers of the user's hand;
fingernail nozzle means positioned within each one of said plurality of finger receptacles for directing a pulsating liquid jet toward each of the fingernails of the user's hand;
a reservoir for storing a supply of liquid; and
pump means including an intake port coupled to said reservoir and a discharge port coupled to said fingernail nozzle means, said pump means being operative for withdrawing liquid from said reservoir and for discharing the liquid in pulsating jets for delivery to said fingernail nozzle means.

4,020,857
APPARATUS AND METHOD FOR PRESSURE CLEANING AND WAXING AUTOMOBILES AND THE LIKE
Louis Frank Rendemonti, 700 New York Ave., Point Pleasant Beach, N.J. 08742
Filed Apr. 13, 1976, Ser. No. 676,557
Int. Cl.² B08B *7/00*
U.S. Cl. 134—7 **3 Claims**



1. A method for treating the surfaces of automobiles in

commercial car wash operations, or the like, comprising the steps:

a. applying a water soluble, thickened liquid cleaner to the surface of the car;

b. blasting the surface of the car with dry water-soluble pellets comprising soda ash beads coated with sodium metasilicate, said blasting to be applied with sufficient pressure to generate frictional cleaning movement to the thickened liquid cleaner, but applied with insufficient pressure to damage the car surfaces by abrasion; and

c. rinsing the car surface with water to remove the cleaner and water soluble pellet material.

4,020,858

SAFETY UMBRELLA

Inez F. Wilson, 1830 Lexington Ave., Apt. 1A, New York, N.Y. 10029

Filed Mar. 22, 1976, Ser. No. 669,144

Int. Cl.² A45B *3/02*

U.S. Cl. 135—20 R **1 Claim**

1. A safety umbrella, comprising in combination, a tubular shaft supporting a foldable framework at its one end, a canopy mounted upon said framework, a hollow handle upon an opposite end of said shaft for being held in a hand, the first said end of said shaft having an integral tip thereof protruding through a center opening of said canopy, an electric lamp mounted around a base end of said tip; said lamp including a Z-shaped bracket secured to a side of said shaft tip, a lamp socket mounted on said bracket, an electric lamp bulb in said socket, said lamp bulb being in a series electrical circuit that includes dry cell batteries and a manually operated switch inside said handle; said circuit including wire conductors inserted inside said tubular shaft, and opening in said shaft located near said bracket having said wire conductors extend outwardly therethrough and being connected to said socket, said shaft tip being diametrically smaller than a remainder of said shaft, a tapering shoulder thus formed adjacent said base end of said tip, a dish-shaped circular reflector, having a central opening, being fitted on said tip and positioned adjacent said shoulder, said reflector having a reflective surface on a concave side thereof facing said lamp bulb, said reflector including a circular peripheral flange extending frusto-conically tapered toward an edge of said flange thus forming a circular channel into which an outwardly flanged edge of a transparent dome is received an open-ended circular wire snap ring received in said channel over said dome flange, said snap ring retaining said dome in said channel, a U-shaped bend along said snap ring extending outwardly of said channel for easy grasp for removal of said snap ring from said channel, said dome having a central opening for fitting a terminal end of said shaft tip therethrough, an opposite end of said wire conductors being connected to said batteries and said switch, said hollow handle having an opening on its terminal end, a removable end cap frictionally fitted on said handle end closing said opening, a row of buttons around an outer side of said handle and another row of buttons around an outer side of said end cap, each said buttons of said handle aligning with of a button of said end cap, a rubber band snapped around each pair of said aligned buttons, said switch being mounted upon an inner side of said end cap, a switch button of said switch extending outwardly through said end cap, and a compression coil spring around said switch bearing at one end against said end cap and bearing at the other end against an end wall of one said batteries said spring urging an opposite end of an opposite endmost battery with a battery terminal plate thus completing said circuit through said spring.

4,020,859

SYSTEM FOR CONTROLLING PRESSURE BY ACOUSTIC MEANS

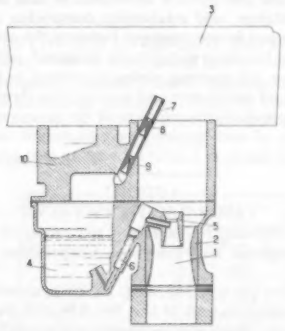
Jean Malphettes, and Pierre Fontanet, both of Versailles, France, assignors to Regie Nationale des Usines Renault, Paris and Automobiles Peugeot, Boulogne-Billancourt, both of, France

Division of Ser. No. 361,064, May 17, 1973, Pat. No. 3,916,020. This application June 9, 1975, Ser. No. 584,936

Claims priority, application France, May 29, 1972, 72.19147

Int. Cl.² F02M *5/08*

U.S. Cl. 137—14 **3 Claims**



1. A method of continuously controlling pressure of a fluid in a chamber from a periodic acoustic source, comprising the steps of: selecting a variable, periodic acoustic source; connecting the chamber to the periodic source through a single conduit having means for establishing a first pressure loss for said fluid flowing from said acoustic source into said chamber and a second pressure loss for fluid flowing from said chamber into said acoustic source, said first and second pressure losses being different; orienting the conduit to establish a flow therethrough in a preselected direction; varying the amplitude of the acoustic source and continuously utilizing said periodic source to modulate the pressure of fluid in the chamber as a function of the amplitude of the acoustic source.

4,020,860
DEVICE FOR DISSIPATING THE ACCIDENTAL OVER-PRESSURE OF A FLUID

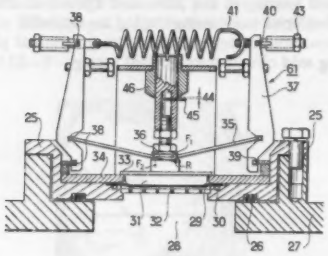
Jacques Fournier, Lyon, and Edmond Thuries, Pusignan, both of France, assignors to Delle-Alsthom, Villeurbanne, France

Filed Apr. 3, 1975, Ser. No. 564,976

Claims priority, application France, Apr. 26, 1974, 74.14706

Int. Cl.² F16K *17/40*

U.S. Cl. 137—69 **3 Claims**



1. In a device for dissipating the accidental over-pressure of a fluid container in an enclosure provided with a fluid-tight membrane which moves in response to the over-pressure to vent the container, the improvement comprising: a mobile piston mounted for movement adjacent the membrane and positioned on the opposite side of the membrane from the fluid and retaining the membrane against the action of the pressure of the fluid and an overcenter spring mechanism operatively associated with said piston including a spring and having a threshold of balance such that in a first state relative to the threshold of balance it applies a spring biasing force to the piston in opposition to the action of the pressure of the fluid, and which in the event of an over-pressure of the fluid, is actuated by the piston to the extent that it reaches its threshold of balance and passes into a second state relative to the threshold of balance where the spring biasing force acts in the same direction as the fluid pressure to release the piston from said membrane and permits movement of said membrane to vent the container, said mechanism comprising a set of connecting rods and levers arranged between the spring and the piston and a breaking part fixedly mounted with respect to said container and resisting piston movement in the direction away from said membrane and wherein the threshold of balance corresponds to the position of the piston which causes the breaking of said breaking part to permit the fluid-tight membrane to move to a position venting said container.

4,020,861
VAPOR RECOVERY VALVE

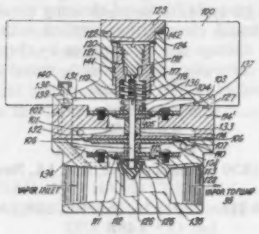
Marwan S. Shihabi, Northridge, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 494,391, Aug. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 439,225, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 429,555, Jan. 2, 1974, abandoned. This application Aug. 20, 1975, Ser. No. 606,312

Int. Cl.² F16K *17/00*

U.S. Cl. 137—100 **2 Claims**

1. A control comprising: a valve housing including means defining first and second passage therethrough constructed to receive gasoline vapor and gasoline, respectively, said first passage being adapted to be coupled to a first line and said second passage being adapted to be coupled to a second line; a restriction in said second passage for producing a pressure differential proportional to the rate of flow of fluid passing through said second line, said housng being divided into first and second cavities by a movable member; first means providing flow communication between said first cavity and said restriction; second means providing flow communication between said second cavity and an unrestricted portion of said second passage whereby said movable member is subjected to said pressure differential; a valve seat formed in said first passage; and a valve element in said first passage fixed to said movable member and positioned to close said valve seat, said



valve element shifting away from said valve seat in response to said pressure differential whereby the rate of flow of fluid passing through said first passage will be a predetermined function of the rate of flow of fluid passing through said second passage; and means biasing said valve element against said valve seat to normally prevent flow of fluid through said first passage.

4,020,862
APPARATUS FOR CONTROLLING THE VOLUME AND PRESSURE OF A PRESSURE MEDIUM IN A DIE-CASTING MACHINE

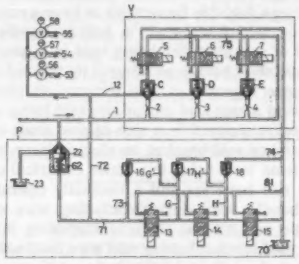
Friedrich Böhnlein, and Roland Geier, both of Brescia, Italy, assignors to Idra-Pressen G.m.b.H., Stuttgart, Germany

Continuation-in-part of Ser. No. 528,672, Dec. 2, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 669,145

Claims priority, application Germany, Dec. 15, 1973, 2362482

Int. Cl.² F16K *11/10*

U.S. Cl. 137—115 **6 Claims**



1. Apparatus for controlling the volume and pressure of a flow of hydraulic fluid from a supply to a drive of a die-casting machine comprising:

an inlet line,

an outlet line,

volume flow limiting means between the inlet and outlet lines,

pressure control means connected to the outlet line,

the volume flow limiting means including a plurality of diaphragms of fixed area arranged in parallelism,

a respective one-way valve and a respective actuating valve backing each diaphragm of the volume flow limiting means,

the actuating valves being selectively operable for opening any selected number of one-way valves under the pres-

sure of fluid in the inlet line and for allowing flow through a corresponding selected number of diaphragms,

a cascaded plurality of spring-loaded valves each opening at a specific pressure,

the pressure control means including a connecting line between the outlet line and the first of the spring-loaded valves,

a pressure actuating valve in parallel with each of the springloaded valves,

with selective operation of the pressure actuating valves being effective to cause a selected number of the spring-loaded valves to be series connected for causing the prevail of any one of a range of pressures in the connecting line and in the outlet line,

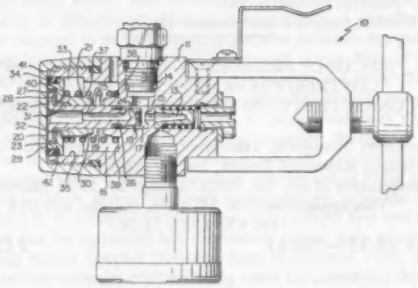
and a pressure-biased relief valve having its biasing pressure taken from the connecting line and being responsive to the pressure in the inlet line for relieving that pressure upon rising above the biasing pressure.

4,020,863

FLUID PRESSURE REGULATOR CONSTRUCTION

Donald C. Fabish, Anaheim, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Oct. 9, 1975, Ser. No. 621,062
Int. Cl.² G05D *16/10*
U.S. Cl. 137—116.5 **10 Claims**



1. In a fluid pressure regulator construction having a housing means provided with a fluid pressure supply inlet and a reduced fluid pressure outlet separated by a main valve seat that is controlled by a main valve member having a piston head secured thereto to move in unison therewith in all operating conditions of said regulator construction and be subjected to intermediate fluid pressure intermediate said valve seat and said outlet so as to cause movement of said main valve member in a direction along the longitudinal axis of said piston head relative to said main valve seat in relation to said intermediate fluid pressure to tend to regulate said intermediate fluid pressure to a predetermined amount, with such housing means having relief valve means for relieving excess intermediate fluid pressure, the improvement wherein said piston head includes said relief valve means for relieving said excess intermediate fluid pressure acting thereon, said relief valve means comprising a relief valve seat substantially concentric with said longitudinal axis of said piston head and a relief valve member also substantially concentric with said longitudinal axis.

4,020,864

BALL VALVE

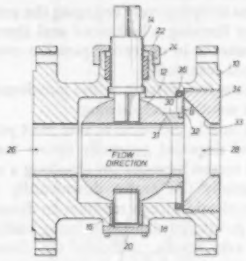
Edgar H. Church, Jr., 1301 Cactus Drive, Baytown, Tex. 77520

Filed July 16, 1975, Ser. No. 596,440
Int. Cl.² F16K *15/00*
U.S. Cl. 137—242 **14 Claims**

1. In a ball valve utilized in high temperature applications having appreciable quantities of agglomerating materials in the fluid stream, characterized by having a valve body having inlet and outlet ports, a ball, a valve stem, a packing cup, stem packing and a valve seat, an improved movable valve seating means comprising

a spring washer coaxially disposed in said valve body inlet port upstream of said valve ball,

a movable valve seating ring coaxially carried by the inner diameter portion of said spring washer and having an arcuate seating surface for sealing contact with the surface of said valve ball, said spring washer flexing under the differential pressure applied over the spring washer surface when said vale ball is closed for increasing the sealing force exerted by said valve seating ring against said valve ball, and



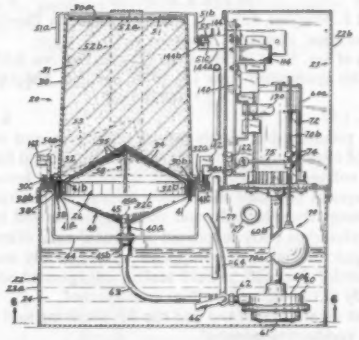
an inlet port throat having a conical surface tapering toward said spring washer and terminating adjacent said washer for providing a wedge-shaped void therebetween opening into the fluid stream through the valve, said conical surface cooperating with the relative movement of said spring washer due to pressure and thermal differentials for forming a means for subjecting solid agglomerating material accumulating adjacent to and upstream of said spring washer to shear forces for fracturing said solid agglomerating material and expelling said material into the fluid stream.

4,020,865

REMOTE POWDER DETERGENT DISPENSER

Robert B. Moffat, West St. Paul; David L. Nystuen, Bloomington, and Thomas H. Imdieke, Circle S. Hastings, all of Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.

Filed Oct. 3, 1975, Ser. No. 619,530
Int. Cl.² B67D *5/08*
U.S. Cl. 137—268 **23 Claims**



1. A remote powdered detergent dispenser of the type which produces a concentrated detergent solution from powdered detergent within a container for supplying a remotely located washing machine therewith, comprising:

a. a chassis defining a reservoir, said chassis having an upper inlet port opening into said reservoir;
b. a continuous curved screen member overlying and completely covering said inlet port, said curved screen member being shaped to present a downwardly facing concave surface with respect to the underlying reservoir and having a mesh sized to prevent powdered detergent from passing therethrough;
c. means for positioning and for holding a powdered detergent bearing container in an inverted position in overlying engagment with said curved screen member such that said screen member projects into the mouth of the container and is convexly disposed relative to the inside of the container for supportingly engaging the powdered detergent in the container;
d. seal means cooperatively engaging the container and said chassis for forming a leakproof seal therebetween when the container is in operative position overlying the inlet port to said reservoir;
e. spray means for converting the powdered detergent to a detergent solution, comprising:
i. a single nozzle mounted at said inlet port to said reservoir and disposed generally below the center of said curved screen member for directing a uniform spray at substantially the entire downwardly facing concave surface of said screen member to dissolve that portion of the powdered detergent being carried immediately above said screen, whereby the dissolved detergent passes in solution through the screen and is collected by said underlying reservoir; and
ii. a pump connecting said reservoir and said nozzle, operative when energized to generate said spray by forcing solution from the reservoir through said nozzle;
f. spray control means operatively connected with said spray means for selectively energizing said pump so as to maintain within said reservoir a predetermined volume of said detergent solution; and
g. safety control means for selectively blocking energization of said pump, said safety control means being operative to prevent the spray of said solution through said nozzle whenever the container is not operatively positioned over said inlet port.

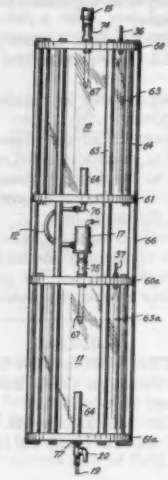
4,020,866

PRESSURE VESSEL FOR VOLTAGE BLOCK MATERIAL SUPPLY SYSTEM

Richard F. Wiggins, Fairfield, Conn., assignor to The Gyromat Corporation, Stratford, Conn.

Division of Ser. No. 421,504, Dec. 3, 1973, Pat. No. 3,933,285. This application June 13, 1975, Ser. No. 586,557
Int. Cl.² B67D *5/08*
U.S. Cl. 137—592 **6 Claims**

1. A pressurizable supply vessel to receive and retain a supply of electrically conductive liquid material and for use in a high voltage electrostatic paint spray system including a supply system provided with means to prevent electrical current passage therethrough, said vessel characterized by
a. a cylindrical body supported in vertical axial orientation,
b. a pair of end caps comprised of electrically insulating material disposed in fluid sealing engagement with said body at the top and bottom ends thereof,
c. inlet means in said top end cap for receiving said electrical conductive material,
d. said inlet means including a tube comprised of electrical insulating material, said tube extending lengthwise of said body, downwardly into said vessel,
e. said tube terminating in a discharge opening spaced at predetermined minimum distances from the walls of said cylindrical body, and said top and bottom end caps, whereby said discharge opening is spaced beyond the arcing distance for voltages utilized in said electrostatic



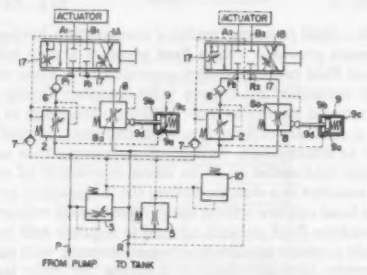
paint spray system, and
f. outlet means in said bottom cap.

4,020,867

MULTIPLE PRESSURE COMPENSATED FLOW CONTROL VALVE DEVICE OF PARALLEL CONNECTION USED WITH FIXED DISPLACEMENT PUMP

Toshinari Sumiyoshi, Yokohama, Japan, assignor to Nisshin Sangyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 500,470, Aug. 26, 1974, abandoned. This application Feb. 24, 1976, Ser. No. 661,051
Int. Cl.² F15B *13/08*
U.S. Cl. 137—596.13 **2 Claims**



1. A control valve device for controlling the flow of pressure liquid to a plurality of hydraulic actuators from a single hydraulic pump, each actuator having a supply line and a return line and the pump having a supply line, and there being a storage tank to which there is a return line and from which the pump draws liquid, said control valve device comprising a plurality of directional valve units each having a directional valve adapted to be connected in parallel between the pump supply line and the respective supply and return lines of the actuators and between the respective supply and return lines of the actuators and the return line, a plurality of first pressure compensating valves, one coupled to each directional and having means for adjusting the opening thereof in response to the pressure difference across the corresponding directional valve, a second pressure compensating valve unit having a single second pressure compensating valve therein adapted to be coupled between the pump supply line and the return line for bypassing said directional valves, pilot pressure sensing means coupled between each directional valve and said sec-

ond pressure compensating valve for conveying liquid under the pressure in the directional valve to said second pressure compensating valve for adjusting the position of said second pressure compensating valve, check valves in said pilot pressure sensing means associated with each directional valve whereby only the liquid under pressure in the highest pressure directional valve is transmitted to said second pressure compensating valve, a pressure compensated leak valve coupled to said pilot pressure sensing means for bleeding a slight amount of liquid under pressure from said pilot pressure sensing means at all times said leak valve comprising valve means for passing less fluid the greater the pilot pressure, a plurality of third pressure compensating valves, one coupled to each directional valve and adapted to be coupled to said return line and having means for adjusting the opening thereof in response to the pressure difference across the corresponding directional valve, and switching cylinders adapted to be coupled to said pump supply line and operably coupled with said third pressure valves for normally urging said third pressure valves to close and for being disconnected from said third pressure valves when the pressure in the pump supply line rises above a predetermined value.

2. A control valve device for controlling the flow of pressure liquid to a plurality of hydraulic actuators from a single hydraulic pump, each actuator having a supply line and a return line and the pump having a supply line, and there being a storage tank to which there is a return line and from which the pump draws liquid, said control valve device comprising a plurality of directional valve units each having a directional valve adapted to be connected in parallel between the pump supply line and the respective supply and return lines of the actuators and between the respective supply and return lines of the actuators and the return line, a plurality of first pressure compensating valves, one coupled to each directional valve and having means for adjusting the opening thereof in response to the pressure difference across the corresponding directional valve, a second pressure compensating valve unit having a single second pressure compensating valve therein adapted to be coupled between the pump supply line and the return line for bypassing said directional valves, pilot pressure sensing means coupled between each directional valve and said second pressure compensating valve for conveying liquid under the pressure in the directional valve to said second pressure compensating valve for adjusting the position of said second pressure compensating valve, check valves in said pilot pressure sensing means associated with each directional valve whereby only the liquid under pressure in the highest pressure directional valve is transmitted to said second pressure compensating valve, and a pressure compensated leak valve having a cylinder therein with an outlet therefrom to said return line, a spring loaded hollow piston slidable in said cylinder at a point spaced from said oulet and having a leak bore extending longitudinally therethrough, said leak valve further having a lateral passage opening into said cylinder from said pilot pressure sensing means, and said piston having a lateral passage opening into the hollow thereof and cooperating with said first mentioned lateral passage for opening and closing said first mentioned lateral passage during movement of said piston against said spring loading, whereby a slight amount of liquid is bled under pressure from said pilot pressure sensing means at all times and said leak valve passing less fluid the greater the pilot pressure.

4,020,868
ALTERNATOR VALVE

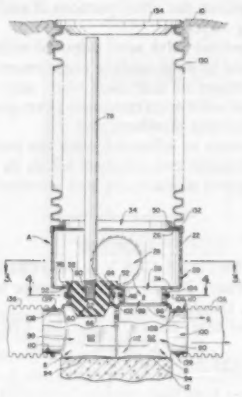
John D. Schmunk, Findlay, Ohio, assignor to Hancor, Inc., Findlay, Ohio

Filed Nov. 12, 1975, Ser. No. 630,984
Int. Cl.² F16K *11/00*
U.S. Cl. 137—610 21 Claims

1. An alternator valve comprising:

a housing having a continuous side wall, a bottom wall and a top wall defining a hollow valve chamber, said housing including an inlet opening and at least two spaced apart outlet openings communicating with said chamber from outside of said housing, said top wall having a valve plug receiving opening and said outlets each having a surrounding valve seat area disposed in said chamber adjacent thereto; and,

a valve plug received in said chamber through said plug receiving opening in a blocking position with at least one of said outlets while allowing communication through said chamber between said inlet and the other of said outlets, said valve plug comprising a resilient body having

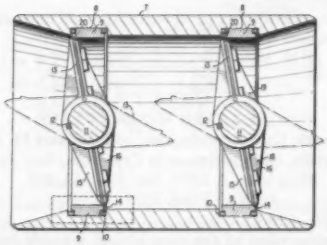


a plug portion loosely received in said at least one outlet and an inner end portion having a cross-sectional dimension greater than the cross-sectional dimension of said plug portion and said outlets, said inner end portion including a resilient sealing area disposed under the weight of at least said valve plug in sealing engagement with the seat area surrounding said at least one outlet, said valve plug being selectively movable through said receiving opening between separate blocking positions with the other of said outlet openings.

4,020,869
COMBINED STOP AND INTERCEPT VALVE FOR STEAM TURBINES

Donald H. Davis, Scotia, and John G. Mossey, Waterford, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 20, 1975, Ser. No. 588,767
Int. Cl.² F16K *1/228*
U.S. Cl. 137—613 1 Claim



1. In a combined stop and intercept valve disposed between and in fluid communication with a high-pressure stage and a

low-pressure stage of a steam turbine, the improvement comprising:

a. a generally cylindrical valve casing having annular grooves disposed in the interior surface thereof;

b. first and second shafts mounted for rotation within said casing;

c. first and second substantially circular aerodynamic butterfly valve discs rotatably mounted within said casing on said shafts, said discs being axially spaced apart a distance less than one disc diameter such that a portion of said second disc overlaps a portion of said first disc when said valve is open, each of said discs comprising two offset overlying plates, the offset portions of said plates defining flat sealing surfaces;

d. first and second valve seats disposed within said annular grooves and in face sealing engagement with said flat sealing surfaces of said discs when said valve is closed each of said valve seats comprising two generally opposed semiannular seat members; and

e. spacing means to adjustably vary the position of one of said semiannular seat members within its groove relative to the opposed semiannular seat member.

4,020,870

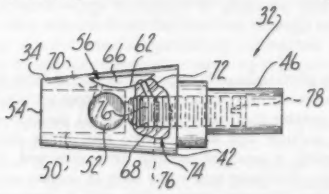
CONVERTIBLE GAS VALVE STRUCTURE

Everett W. Carlson, Detroit, Mich., assignor to Lincoln Brass Works, Inc., Detroit, Mich.

Filed Mar. 26, 1976, Ser. No. 670,754

Int. Cl.² F16K *11/083*

U.S. Cl. 137—625.3 **15 Claims**



1. In a gas valve having a body with an inlet and an outlet and having a rotatable valve member provided with an internal gasway and porting which place said inlet and outlet in communication upon movement of said valve member from off position selectively to high, intermediate and low positions, improved structure wherein,

said porting includes a relatively large diameter port registrable with said inlet in said high position,

said porting also including first and second pairs of relatively small diameter ports, said pairs being spaced from each other axially of said valve member,

the ports of each pair having outer ends which communicate with said inlet in said intermediate position,

each pair having a single port which communicates with said inlet in said low position,

the ports of each pair having an inner end which opens into said gasway,

and means selectively operable to close and open said inner ends of said second pair of ports.

4,020,871

SINGLE LEVER MIXING VALVE

Hugh F. Groth; Carl E. Bochmann, and Guilbert M. Hunt, all of Brecksville, Ohio, assignors to Crane Co., New York, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,495

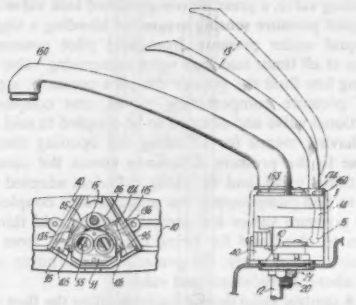
Int. Cl.² F16K *7/06, 11/18*

U.S. Cl. 137—636.1 **11 Claims**

1. A mixing valve of the type having a single handle for controlling the volume and relative proportion of hot and cold water flowing through the valve including:

a. a housing adapted to receive a squeeze element assembly and linkage assembly, said housing having a hot water inlet port, a cold water inlet port and a discharge means;

b. a squeeze element assembly positioned in said housing between said inlet ports and discharge means, said assembly including a plurality of squeeze elements, each squeeze element individually communicating with one of said inlet water ports;



c. a plurality of cams positioned in said housing, each cam adapted to restrict the cross sectional area of the respective squeeze element; and

d. a linkage assembly pivotally connecting with the handle for selectively moving each cam relative to a squeeze element whereby said cams cooperate with said squeeze elements to independently regulate the flow rate of water through said hot and cold water inlet ports to said discharge means.

4,020,872

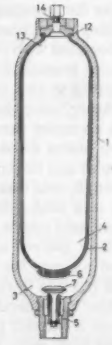
ACCUMULATOR

Nobuyuki Sugimura, and Kazuo Sugimura, both of 308 Mabase, Shimizu, Shizuoka, Japan

Filed Nov. 13, 1975, Ser. No. 631,540

Int. Cl.² F16L *55/04*

U.S. Cl. 138—30 **3 Claims**



1. In a hydraulic accumulator having an upright pressure vessel with an oil port at the bottom and a gas inlet at the top with a deformable, uniformly flexible bladder secured to the vessel and separating the gas and hydraulic fluids in the vessel,

means securing the bladder to the upper end of the vessel with a central lower portion movable toward the oil port upon expulsion of hydraulic fluid through the oil port,

a poppet valve for the oil port having a head positioned on the interior of the vessel,

a cushion member carried by the bladder centrally over the poppet valve, said cushion member being flexible and located to engage the head of the poppet valve and extend thereover preventing contact between the bladder

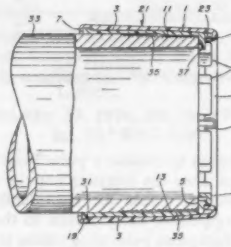
material and the poppet valve head and cushioning the bladder against concentrated bending over the poppet valve,

said cushion members having a peripheral portion flexible relative to the bladder so that oil may enter a peripheral space between the bladder and cushion member over the poppet valve head periphery and a central portion secured to the bladder in a position centrally over the poppet valve securing the cushion to the bladder for movement therewith upon ingress and egress of the oil in the vessel and insuring bladder contraction away from the poppet valve upon ingress of oil into the vessel.

4,020,873
THREAD PROTECTOR FOR AN EXTERNALLY THREADED PIPE

Ronald H. Palarino, North Huntington, Pa., assignor to Precise Metals & Plastics, Inc., East McKeesport, Pa.

Filed July 18, 1975, Ser. No. 597,239
Int. Cl.² B65D *59/06*
U.S. Cl. 138—96 T **9 Claims**



1. A thread protector for protecting the externally threaded ends of a pipe, comprising:

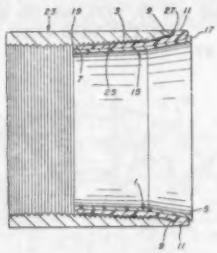
a. at least two spaced confronting arcuate sections each section having a top edge and a bottom edge, the top edge of each arcuate section formed as a radially inwardly directed annular flange with a plurality of radially inwardly directed, upwardly projecting bosses formed on each flange, each arcuate section having threads on the inner surface thereof adapted to engage said external threads of said pipe and a continuous raised peripheral shoulder on the outer surface thereof proximate the bottom edge with adjacent arcuate sections being interconnected at a point proximate their respective top edges to form a substantially contiguous cylindrical casing having a top end and a bottom end corresponding to the respective top edges and bottom edges of said arcuate sections; and

b. a unitary cylindrical sleeve having a top end and a bottom end corresponding with the top end and bottom end of said casing, the top end of said sleeve formed as a radially inwardly and downwardly depending annular lip and a continuous peripheral channel formed in the inner surface of the sleeve proximate the bottom end thereof adapted to engage the continuous raised peripheral shoulder on the casing whereby when the casing is placed on the threaded end of the pipe and coaxial therewith and the sleeve is force fitted over the casing and coaxial therewith the threads of the casing engage the threads of the pipe, the annular flange contacts and overlays the end of the pipe, the shoulder engages within the channel of the sleeve and the lip of the sleeve contacts and overlays the flange of the casing to secure the thread protector in place over the threaded end of the pipe and to preclude removal thereof except by unscrewing the same as a unit from the threaded end of the pipe, the securement being such that the sleeve may rotate about its longitudinal axis relative to the casing and pipe such that forces tending to rotate the sleeve will not disengage the casing from the pipe.

4,020,874
THERMOPLASTIC THREAD PROTECTOR FOR INTERNALLY THREADED PIPE

Ronald H. Palarino, North Huntington, Pa., assignor to Precise Metals & Plastic, Inc., East McKeesport, Pa.

Filed Sept. 5, 1975, Ser. No. 610,646
Int. Cl.² B65D *59/00, 59/04*
U.S. Cl. 138—96 T **6 Claims**



1. A thermoplastic thread protector for the inner threads of a pipe or coupling, comprising:

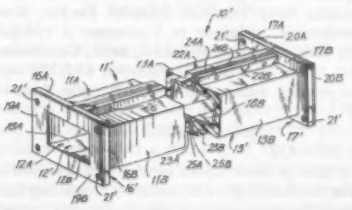
a frusto-conically shaped shell having threads on the outer wall thereof, the length of the shell sufficient to cover the threaded portion of the pipe, said shell terminating at the wide end thereof as a flange extending away from the longitudinal axis of the shell, the flange having spaced outwardly and axially extending projections; and

a frusto-conically shaped expansion ring having an outwardly extending rim around the wide end thereof and an outwardly directed lip around the other end, the ring being of such a dimension that when inserted into the shell, with the shell placed in the pipe and the flange thereof resting on the end of the pipe, the shell is expanded to lock the threads thereof with the pipe threads and concentrically mate the ring and shell, with the ends of the shell contiguous with and locked between the rim and lip of said ring.

4,020,875
WAVEGUIDE ELEMENTS

Kosuke Akiba, Tama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 11, 1975, Ser. No. 603,535
Claims priority, application Japan, Aug. 14, 1974, 49-97003[U]
Int. Cl.² H01P *3/14*; F16L *11/12*
U.S. Cl. 138—128 **5 Claims**



1. A microwave waveguide element for transmitting microwave signals comprising first and second complementary body parts each formed of plastics resin and each having a rectangular longitudinal channel, said first and second body parts each having a pair of longitudinal mating flanges parallel to said channel and along the longitudinal edges thereof; a con-

tinuous conductive metal layer applied by electroless plating to the surface of each said channel and to the surface of each said mating flange and means for joining the respective mating flanges of said first and second body parts to form a tubular microwave waveguide element with a rectangular cross-section having the longitudinal joints in said metal layer provided in the respective relatively longer sides of said rectangular cross-section.

4,020,876

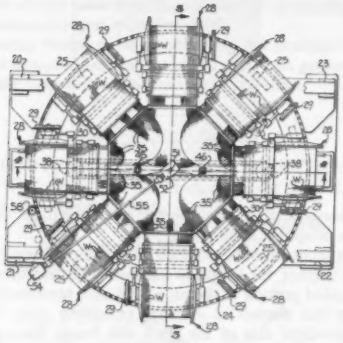
TRIAXIAL WEAVING MACHINE WITH FLEXIBLE PASSAGEWAYS FOR GUIDING WARP STRANDS

Franklin L. Townsend, and Robert L. Govig, both of Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Jan. 29, 1976, Ser. No. 653,371

Int. Cl.² D03D *41/00*

U.S. Cl. 139—97 **15 Claims**



1. In a weaving machine for making triaxial fabrics and having a plurality of elongated heddles arranged in weftwise rows for guiding warp strands, means for shifting the warp strands weftwise during weaving, creel means for supplying warp strands for weaving and mounting for rotation in timed relation with weftwise shifting of the warp strands, and means for guiding warp strands passing from said creel means to said heddles along substantially constant length paths, the improvement wherein said warp strand guiding means comprises a plurality of elongate flexible warp strand guides for guiding the warp strands along their path of travel from said creel means to said heddles, said elongate guides having entry end portions mounted for movement in timed relation with rotation of said creel means and having exit end portions arranged in weftwise rows substantially aligned with the weftwise rows of heddles and mounted for movement in timed relation with weftwise shifting of the warp strands.

4,020,877

WEFT INJECTION SEQUENCE CONTROLLER FOR A FLUID-JET LOOM

Juraj Spisiak; Milos Jansa, both of Brno; Miloslav Bezdek, Charvatska Nova Ves, and Stanislav Ferdus, Brno, all of Czechoslovakia, assignors to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi, Brno, Czechoslovakia

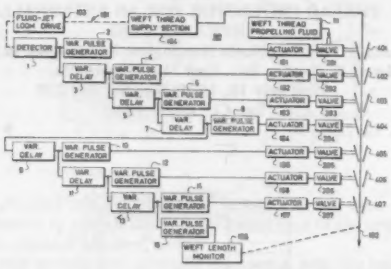
Filed June 9, 1976, Ser. No. 694,236

Claims priority, application Czechoslovakia, June 10, 1975, 4033/75

Int. Cl.² D03D *47/30*

U.S. Cl. 139—435 **4 Claims**

1. In a fluid jet loom operable at a first rate and having N successive nozzles adapted to receive a propelling fluid from a fluid source for successively conveying a weft thread along a prescribed operating path, the loom having N normally closed, electromagnetically actuable valves individually coupling the fluid source to the N successive nozzles, each valve being operable for conveying fluid to the associated nozzle while the valve is operated, and means for cyclically operating the successive nozzles, the improvement wherein the cyclic operating means comprises, in combination, detecting means operable at the first rate for producing an initiating impulse at a specified instant during each cycle of operation of the loom, N first means for generating, at the first rate, an individual succession of pulses having a duration equal to a first interval, N actuator means coupled between the outputs of the respective first pulse generating means and individual ones of the valves for operating the valves over the duration of the pulse emitted from the associated first pulse generating means at the first rate, N−1 delay means each adapted to provide a pulse transition at its output at the conclusion of a second interval following the application of a pulse transition to its input, first means for coupling the output of the detecting means to the input of the first pulse generating means associated with the first nozzle in the succession to initiate a pulse from said first pulse generating means when the initiating impulse is emitted from the detecting means, means for individually coupling the outputs of the respective delay means to the inputs of the remaining N−1 first pulse generating means to initiate a pulse from each first pulse generating means in response to a pulse transition at the output of the associated delay means, means for coupling the output of the detecting means to the input of the delay means associated with the second nozzle in the succession, and means for individually coupling the outputs of each delay means to the input of the next succeeding one of the delay means.



4,020,878

METHOD AND APPARATUS FOR MAKING ANNULAR METALLIC BLANKS

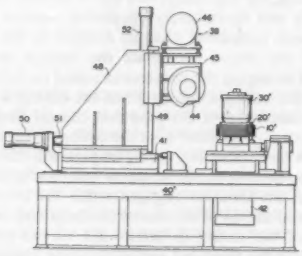
Kazuyoshi Yashiro, Kure, Japan, assignor to Benda Kogyo Co., Ltd., Japan

Filed Oct. 23, 1975, Ser. No. 625,105

Claims priority, application Japan, Aug. 19, 1975, 50-100551

Int. Cl.² B21F *37/00*

U.S. Cl. 140—88 **6 Claims**



1. An apparatus for making annular blanks for rings having a predetermined inner diameter used to fabricate ring gears, said apparatus comprising:

a hollow circumferentially expandable cylindrical member

having a longitudinal slit therethrough parallel to the axis thereof for aiding in the expansion of said member;

cylindrical mandrel means insertable into said cylindrical member for expanding said cylindrical member, said mandrel means being of sufficient diameter to expand said cylindrical member to an outside diameter greater than the inside diameter of said rings having a predetermined inner diameter;

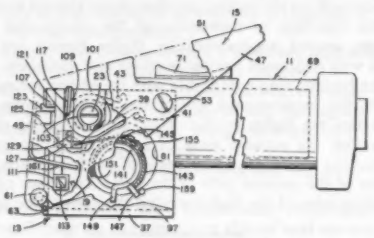
a spiral member coaxially and loosely positioned around said cylindrical member while said cylindrical member is not expanded, whereby expanding said cylindrical member by inserting said mandrel means thereinto causes said cylindrical member to expand against and expand said spiral member; and

cutting means adjacent said cylindrical member and said spiral member for cutting said spiral member along a straight line parallel to the axis of said cylindrical member after said cylindrical member with said spiral member theresurrounding are expanded by the insertion of said mandrel means, whereby after said spiral member is cut by said cutting means, a plurality of blanks are formed for forming said rings.

4,020,879
POWER STRAPPING TOOL

Ronald J. Billett, Sunnyvale, and Bruce M. Harper, San Jose, both of Calif., assignors to FMC Corporation, Philadelphia, Pa.

Filed May 28, 1976, Ser. No. 691,257
Int. Cl.² B21F 9/00
U.S. Cl. 140—123.6 **16 Claims**



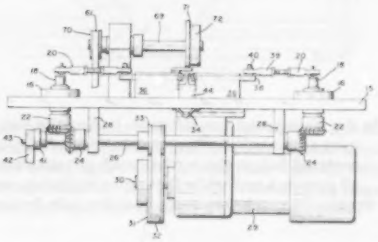
1. A tool for tensioning a length of strapping about a package and preparing the same for severence from a strapping supply, said tool having a main body, an assembly including an anvil mounted on said main body, a wheel, means supporting said wheel for rotation relative to said main body, said anvil and said wheel being adapted to engage, respectively, with an end portion and an overlapping intermediate portion of strapping looped about a package and extending to a supply, and means on said main body for rotating said wheel in one direction for tensioning the loop of strapping and maintaining the same tensioned during connection of overlapping portions thereof to each other at a location removed from said wheel, and in an opposite direction for flexing away from the underlying strapping portion a span of the overlying strapping portion extending between said wheel and the location of strapping connection.

4,020,880
APPARATUS AND METHOD FOR SHAPING AND CUTTING INTEGRATED CIRCUIT COMPONENTS

Martin G. Heller, Short Hills; Richard L. Cheney, Lake Hiawatha, and Karl H. Kautzmann, Westfield, all of N.J., assignors to Martin G. Heller, Short Hills, N.J.

Filed Aug. 19, 1976, Ser. No. 715,869
Int. Cl.² B21F 1/02
U.S. Cl. 140—140 **19 Claims**

1. Apparatus for processing the leads of like IC components which include gravitational feeding of these components to a processing station whereat after processing, an accumulation by gravity is provided in a collecting carrier, said apparatus including: (a) a base; (b) an upper receiving guide and carrier mounted on the base and adapted to accept and receive an IC carrier in which a multiplicity of like-sized IC components are slidably retained for delivery from the lower end of the IC carrier, said guide and carrier disposed at such an angle to the horizontal that the IC components in the carrier when mounted on this guide and carrier are delivered by gravity to said lower end of the upper guide and carrier; (c) a slide guide at the lower discharge end of the upper guide and carrier, and adapted to receive the gravitationally delivered IC components; (d) a processing station carried by the base and including the slide guide and a resilient wheel carried by an arm pivotally mounted on the base, this wheel selectively movable



to a position whereat it is retained with the periphery of the resilient wheel engaging the body of an IC component when delivered to the slide guide, this resilient wheel being intermittently moved by a ratchet and pawl apparatus actuated by a reciprocably moved pitman arm, this arm moved by a motor means; (e) a pair of opposed processing members reciprocably moved in timed relationship to the movement of the resilient wheel, each member disposed to move to and from the slide guide when and while an IC component is held in position by the intermittently rotated resilient wheel, each opposed processing member carried in slide guide support carried by the base, and (f) a lower receiving guide and carrier mounted on the base and adapted to accept and receive an IC carrier in which a multiplicity of like-sized processed IC components are slidably received after delivery, release and discharge of the IC component from the processing station.

4,020,881
AUTOMATIC FILLING OF FLOWER POTS

Günther Nöthen, Provinzialstr. 98, 5216 Niederkassel-Mondorf, Germany

Filed Dec. 21, 1971, Ser. No. 208,793
Claims priority, application Germany, Dec. 22, 1970, 2063002
Int. Cl.² B65B 1/00
U.S. Cl. 141—1 **7 Claims**

1. A method for filling of flower pots with earth or the like and preparing them to receive balled young plants, comprising the successive steps of:

successively discharging, from a magazine onto a horizontal linear conveyor, like trays each having pot-receiving apertures arrayed in a plurality of transverse rows and earth drop-through holes between the apertures;

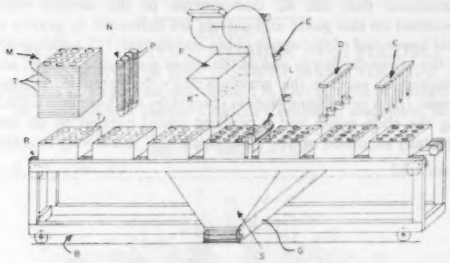
moving said trays incrementally by row spacings on said conveyor through the hereinafter named stations successively;

at a pot supply station, magazine filling successive rows of each tray with pots as the tray is halted in incremental movement, all the apertures of each row being simultaneously filled;

filling earth simultaneously into the pots in each row with a slight excess of earth at an earth filling station as each

successive row of tray-arrayed pots is brought to a halt beneath the earth filling station by the incremental tray movement;

sweeping excess earth from the filled pots as they move from the earth filling station through a leveling station toward a hole-forming station;



in the incremental tray advance, halting the successive pot rows at the hole forming station and forming a generally centered hole in the earth of each pot simultaneously for all pots in a row while the tray is stationary; and

transporting each tray away from the hole forming station.

4,020,882

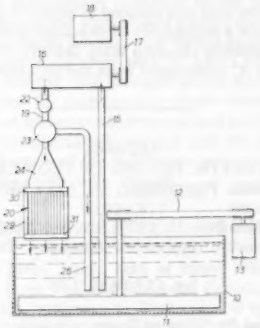
MANUFACTURE OF BATTERY PLATES

Stanley Charles Foulkes, Bolton, England, assignor to Chloride Group Limited, London, England

Filed Oct. 20, 1975, Ser. No. 623,630

Int. Cl.² H01M *4/82*

U.S. Cl. 141—1.1 **18 Claims**



1. A method of filling enveloped plates for batteries which comprises introducing an active material composition into the porous envelope of an enveloped plate when the envelope is assembled on the current conducting element of the plate, characterized in that the active material composition is introduced into the envelope as an aqueous slurry, comprising a lead acid active material composition, which has a rotating vane viscometer torque value in the range 0.006 to 0.06 lbs. ft. at 20° C; said aqueous slurry being introduced into the envelope at a pressure of less than 15 p.s.i. until the envelope is filled with the composition, liquid issuing through the walls of the envelope; the pressure then being allowed to rise to a value above 15 p.s.i. but not in excess of 100 p.s.i. whereafter the pressure is released.

4,020,883

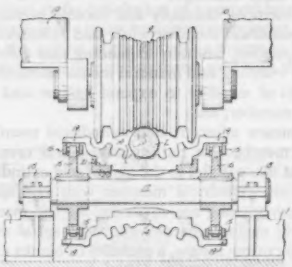
FEED WORKS FOR ROTARY RING LOG BARKERS

Thomas W. Nicholson, Bellevue, Wash., assignor to Nicholson Manufacturing Company, Seattle, Wash.

Filed Apr. 30, 1976, Ser. No. 682,124

Int. Cl.² B27L *1/00*; B65H *17/34*

U.S. Cl. 144—208 E **6 Claims**



1. In feed works for feeding logs to and extracting such logs from a rotary ring type log barker including a rotary barking ring, log-supporting infeed chain means at the infeed side of the barking ring, hold-down means cooperating with the infeed chain means, log-supporting extracting chain means at the outfeed side of the barking ring, hold-down means cooperating with the extracting chain means, and power means for driving the infeed chain means and the extracting chain means conjointly, the infeed chain means and the extracting chain means each including two parallel chains spaced transversely of the direction of movement of the chains and carrying closely spaced log-transporting flights having log-cradling sides with depressed central portions and sprockets adjacent to the barking ring engageable with the chains for supporting them, the improvement comprising flight-mounting means mounting the flights on the chains at locations on the flights such that the arcuate path of said flight-mounting means around the axes of the sprockets is of a radius greater than the radius of the arcuate path of the central portions of the log-cradling sides of the flights around the axes of the sprockets.

4,020,884

PLASTIC BAGS

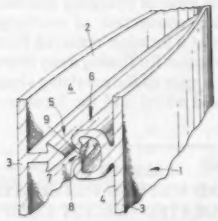
Pierre Gaston Benoit Jadot, 56, Bd. E. Machtens, Molenbeek-Saint-Jean, Belgium

Filed Dec. 2, 1975, Ser. No. 636,955

Claims priority, application Belgium, Dec. 6, 1974, 151241

Int. Cl.² B65D *33/24*

U.S. Cl. 150—3 **4 Claims**



1. A plastic bag, provided adjacent the opening thereof, and on the inner surfaces of the opposite bag walls, with at least one male element which is engageable within an opening within at least one female element to close the bag, there being a yieldable diaphragm which extends across the opening in the female element and through which the male element

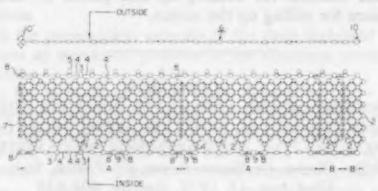
must pass to enable closing of the bag whereby said male and female elements do not engage during manufacture, handling and stacking.

4,020,885

TIRE CHAIN FOR THE PROTECTION AND SLIP PREVENTION OF VEHICLE TIRES

Kazuhiro Satō, Chiba, Japan, assignor to Mitsubishi Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,326
Int. Cl.² B60C *27/06*
U.S. Cl. 152—239 **5 Claims**



1. A tire chain on a tire for protecting said tire and preventing slipping thereof, said chain comprising: a plurality of main metal nets; and a plurality of supplemental metal nets of a shorter length than said main metal nets adjacent and connected to said main metal nets; said connected nets surrounding the circumference of said tire, and each of said main metal nets and said supplemental metal nets being comprised of:

a plurality of link members arranged in a rectangular, planar, net-link configuration;

a plurality of first O-rings loosely connecting adjacent link members near the ends of said link members;

an inside chain loosely connecting said first O-rings positioned along the innermost side of said rectangular configuration, said inside chain being comprised of:

a plurality of first short links,

a plurality of second O-rings linking said first short links, and

a plurality of second short links loosely connecting said first O-rings on the innermost side of said rectangular net configuration to said smaller second O-rings; and

an outside chain loosely connecting said first O-rings positioned along the outermost side of said rectangular net-link configuration, said outside chain being comprised of:

a plurality of third short links,

a plurality of smaller third O-rings linking said third short links,

a plurality of fourth short links loosely connecting said first O-rings on the outermost side of said rectangular net-link configuration to said smaller third O-rings, and

a plurality of elliptical O-rings loosely connected to every other smaller third O-ring.

4,020,886

TIRE CHAIN FOR TRACTORS AND THE LIKE

Gordon Daniel, Mandal, Norway, assignor to Norsk Kjettingindustri A-S Alf Nosted, Mandal, Norway

Filed Nov. 10, 1975, Ser. No. 630,614
Claims priority, application Norway, Nov. 8, 1974, 744032
Int. Cl.² B60C *27/20*
U.S. Cl. 152—243 **4 Claims**

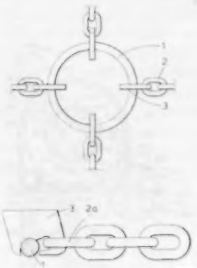
1. A tire chain comprising:

a plurality of longitudinally aligned annular elements;

each said annular element having rigidly fixed thereto a plurality of plate members extending radially of said annular element in planes perpendicular to the general plane of said annular element;

each said plate member having an edge portion with a bifurcated recess therein, said recess including first and second furcations;

said annular elements being joined by chain lengths, each said chain length having end links loosely positioned within first furcations of respective of said plate members; and



each said plate member receiving in the second furcation thereof the respective said annular element, said annular element being rigidly fixed to said plate member within said second furcation and blocking removal of the respective end link from the respective said first furcation.

4,020,887

TIRES REINFORCED WITH STEEL CORD

Nikolai Nikiforovich Vlasov, ulitsa Malysheva 85, kv. 41, Sverdlovsk; Viktor Andreevich Golomazov, ulitsa Lenina, 64, kv. 8, Beloretsk; Nikolai Fedorovich Dubrov, ulitsa Lenina, 5, kv. 55, Sverdlovsk; Leonid Petrovich Zharkov, ulitsa Vasilia Kosorotova, 14, Beloretsk; Vladimir Alexandrovich Karavai, ulitsa Tochisskogo, 11, kv. 18, Beloretsk; Vitaly Kuzmich Likhov, ulitsa Karla Marxa, 53, kv. 54, Beloretsk; Ivan Nikolaevich Petukhov, ulitsa Malakhitovaya, 14, kv. 66, Moscow; Kuart Mikhailovich Petrov, ulitsa Pervomaiskaya, 82, kv. 44, Sverdlovsk; Leonid Dmitrievich Rolschikov, ulitsa Pushkina, 68, kv. 45, Beloretsk; Alexei Ivanovich Saveliev, ulitsa Karla Marxa, 56, kv. 31, Beloretsk; Nikolai Vasilievich Sokolov, ulitsa Lenina, 64, kv. 12, Beloretsk; Mikhail Petrovich Khlestkin, ulitsa Metallurgicheskaya, 113, Beloretsk, all of U.S.S.R.; Karl Borisovich Khusnoyarov, deceased, late of Sverdlovsk, U.S.S.R.; by Evdokia Mikhailovna Lenkova, administrator, and by Nina Karlovna Lenkova, administrator, ulitsa Malysheva, 85, kv. 45, Sverdlovsk, U.S.S.R.

Division of Ser. No. 577,467, May 14, 1975, Pat. No. 3,984,238. This application June 16, 1976, Ser. No. 696,828
Int. Cl.² B60C *9/14*
U.S. Cl. 152—359 **2 Claims**

1. Vehicle tires reinforced with metal cord, the metal of which is a steel which has been treated in a ladle with a slag-forming mixture and inert gas, and which consists essentially of the following elements in weight percent:

C = 0.65–0.85,
Si = 0.20–0.37,
Mn = 0.30–0170,
Co = 0.001–0.005,
Ca = 0.001–0.005,

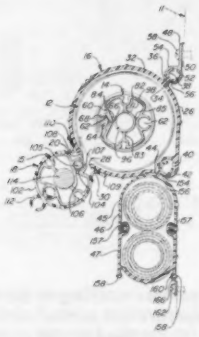
the balance being Fe.

4,020,888

RETRACTABLE AWNING

Albert E. Upton, Wichita, Kans., and Donald S. McKee, Louisville, Colo., assignors to The Scott & Fetzer Company, Lakewood, Ohio

Filed June 21, 1976, Ser. No. 697,777
Int. Cl.² E04F *10/06*
U.S. Cl. 160—66 **3 Claims**



1. A retractable awning adapted to be attached to a supporting surface and being movable between extended and retracted positions comprising in combination:

a roll bar,

a sheet of awning material anchored along an inner edge to said roll bar and adapted to be wound about the roll bar when the awning is retracted,

a case rotatably supporting the roll bar therewithin,

a mounting rail securable to said supporting surface, said mounting rail and case including connecting elements defining means for a releasable tongue-in-groove connection between the case and the mounting rail,

brace members selectively positionable between the roll bar and said supporting surface to hold the awning in the extended position, and

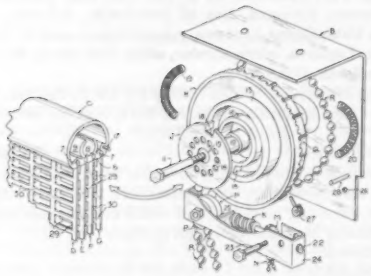
an auxiliary case adapted to store said brace members, and tongue-in-groove connection means connecting said auxiliary case to the first mentioned case.

4,020,889

APPARATUS FOR MANIPULATING A MULTIPLE PANEL SCREEN

Paul Karoll, 2027 Grandville Ave., Los Angeles, Calif. 90025

Filed Aug. 2, 1976, Ser. No. 710,373
Int. Cl.² E06B *9/10*
U.S. Cl. 160—120 **10 Claims**



1. An apparatus for manipulating a multiple panel screen and comprising:

a. an elongated head piece for supporting a plurality of flexible panels forming the screen;

b. a first means for connecting the top ends of said panels to said head piece in spaced parallel relation to one another;

c. a rotatable member operatively connected to said head piece for rotating the head piece on its longitudinal axis for initially shifting said panels vertically with respect to each other and then for rolling the panels onto said head piece for rolling up the screen;

d. a second means for initially rocking said member for rocking said head piece for altering the vertical positions of said panels with respect to each other; and

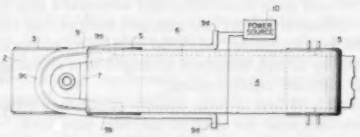
e. a third means for first disconnecting said member rocking means from said rotatable member and then for rotating said member for winding up said panels on said head piece for rolling up the screen.

4,020,890

METHOD OF AND APPARATUS FOR EXCLUDING MOLTEN METAL FROM ESCAPING FROM OR PENETRATING INTO OPENINGS OR CAVITIES

Erik Allan Olsson, Oerlikonerstrasse 88, Zurich, Switzerland

Filed Aug. 13, 1975, Ser. No. 604,428
Claims priority, application Switzerland, Nov. 17, 1974, 14657/74; Nov. 17, 1974, 14659/74
Int. Cl.² B22D *27/02*
U.S. Cl. 164—49 **11 Claims**



1. Apparatus for casting and shaping molten metal into a solidified product, comprising:

a. a molten metal delivery element arranged to receive molten metal from a source of supply;

b. a molten metal receiving element positioned in fixed relation to said delivery element and arranged to receive metal in an entirely molten condition from said delivery element, said receiving element comprising a mold cavity into which the molten metal from the delivery element flows and is solidified;

c. the delivery element having a discharge terminal spaced from the receiving element providing a gap across which molten metal flows from the delivery element to the receiving element; and

d. an electrical conductor connected in series with a source of alternating current and positioned about the gap where an electromagnetic field, that is generated about the conductor when the conductor is energized, serves to confine the flow of molten metal from escape as it flows in a liquid condition from the delivery element into the receiving element.

4,020,891

MELT SPINNING PROCESS AND MACHINE

Ralph P. I. Adler, Glencoe, Ill., assignor to Brunswick Corporation, Skokie, Ill.

Filed Nov. 11, 1974, Ser. No. 522,507
Int. Cl.² B22D *11/124*
U.S. Cl. 164—82 **3 Claims**

1. A method of making substantially straight metal fibers from an enclosed melt pot having at least one orifice, comprising the steps of:

a. charging the melt pot with molten metal;

b. pressurizing the contents of the melt pot to a pressure

sufficient to cause a molten metal stream to flow from the orifice with a velocity V_j;

c. flowing a mass of cooling gas having a velocity, V_c, coaxially around the molten metal stream as it exits the orifice said cooling gas flowing co-currently around the molten stream substantially past the point where the stream is solidified, V_c measured positive in the direction away from the orifice; and

d. adjusting the velocity V_c of the cooling gas to achieve

$$V_p < V_j$$

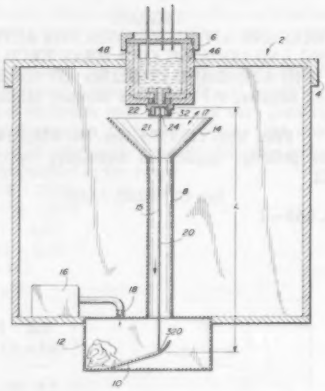
and

$$F_n > F_n^*$$

wherein

V_p is the propagation velocity of the drag sustained deviations as measured positive in the direction toward the orifice,

F_n is the normalized tensile force defined by $(F_g - F_d)/F_g$ where F_g is the gravitational force acting on the filament of length 1 and F_d is the drag force developed by friction of the cooling fluid with the surface of the filament stream, and F_n^* is the normalized tensile force that would cause fibers of length L to be formed by tensile separation.



3. In a machine combination for making metal fibers from a heated melt pot having at least one orifice, the pot charged with a molten metal and pressurized with an inert gas to cause a molten metal stream to flow from the orifice with a velocity V_j, the improvement comprising:

a. means for flowing a mass of cooling gas having a velocity V_c, coaxially around the molten metal stream as it exits the orifice said cooling gas flowing co-currently around the molten stream substantially past the point where the stream is solidified, fresh cooling fluid always surrounding the molten stream;

b. means for adjusting the velocity V_j of the molten stream and the velocity V_c of the cooling stream to provide:

$$V_p < V_j$$

and

$$F_n > F_n^*$$

wherein

V_p is the propagation velocity of the drag sustained deviations as measured positive in the direction toward the orifice,

F_n is the normalized tensile force defined by $(F_g - F_d)/F_g$ where F_g is the gravitational force acting on the filament stream of length 1 and F_d is the drag force developed by friction of the cooling fluid with the surface of the filament stream, and F_n^* is the normalized tensile force that causes fibers of length L to be formed by tensile separation; and

c. means for having the cooling portion of the machine combination open to the atmosphere.

4,020,892

METHOD FOR CONTINUOUS CASTING OF STEEL

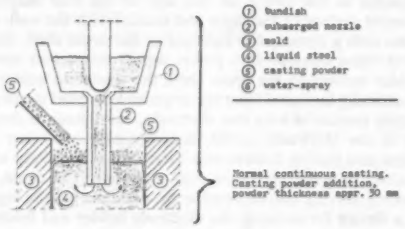
Robert Klages, Dortmund, and Heinrich Kleeschulte, Dortmund-Barop, both of Germany, assignors to Hoesch Aktiengesellschaft, Dortmund, Germany

Continuation-in-part of Ser. No. 306,715, Nov. 15, 1972, Pat. No. 3,866,662, and a continuation-in-part of Ser. No. 530,400, Dec. 6, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,378

Claims priority, application Germany, Nov. 16, 1971, 2156768

Int. Cl.² B22D *11/10, 11/16*

U.S. Cl. 164—89 **8 Claims**



1. A method for continuous casting of quiet steel into a strand, comprising the step of: covering the steel level after filling the stand casting mold at the beginning of casting with a casting powder having a bulk weight in a range of **500** to **1000**, preferably **700** to **900** grams per liter, the collective consumption of casting powder occurring in a quantity of **0.4** to **0.9** kg per tone steel, continuously during the casting adding casting powder for insulation of the steel level and for smearing the mold walls, reducing said adding of casting powder toward the end of the casting so that a slag layer lying below the casting powder layer shines strongly red therethrough and melting the entire casting powder completely at the end of the casting into a thin fluid slag layer, covering the fluid slag in the mold spontaneously and completely uniformly with a supply of water so as to solidify the slag layer and immediately cause it to fall apart, and a short time after the first water supply giving off water a second time upon the exposed steel in a quantity three to four times the first water supply for cooling off and sealing the casting strand.

4,020,893

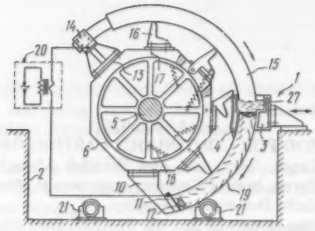
PLANT FOR ELECTROSLAG MELTING OF HOLLOW INGOTS SHAPED AS NON-CLOSED CYLINDERS

Boris Evgenievich Paton, ulitsa Kotsjubinskogo, 9, kv. 21; Boris Izrailevich Medovar, ulitsa A. Barbjusa 22/26. kv. 109; Ilya Iosifovich Kumysh, Vozdukhoflotsky prospekt, 42, kv. 51; Georgy Alexandrovich Boiko, ulitsa Vladimiro-Lybedskaya, 16, kv. 106; Alexandr Petrovich Beloglazov, prospekt Voroshilova, 17a, kv. 16; Rudolf Solomonovich Dubinsky, ulitsa Politekhnicheskaya, 5, kv. 209; Valery Alexandrovich Prikhodko, bulvar Davydova, 7, kv. 158; Jury Vladislavovich Minasevich, bulvar Lepse, 43, kv. 1, all of Kiev; Valentin Sergeevich Zameshaev, prospekt Kalinina, 21, kv. 412, Moscow; Jury Alexandrovich Nadtochy, ulitsa Lenina, 20, kv. 16; Alexandr Ivanovich Zvyagintsev, ulitsa Mira, 16, kv. 12, both of Tolyatti Kuibyshevskoi oblasti, and Anatoly Georgievich Ushakov, ulitsa Tikhomirova, 17, korpus 3, kv. 157, Moscow, all of U.S.S.R.

Continuation of Ser. No. 537,381, Dec. 30, 1974, abandoned. This application Nov. 3, 1975, Ser. No. 628,425

Int. Cl.² B22D *27/02*

U.S. Cl. 164—252 **5 Claims**



1. A plant for the electroslag melting of ingots shaped as non-closed cylinders, comprising: a frame; a water-cooled mould fixed on the frame with mould walls shaping an internal and external surface of the ingot being radially congruent with an ingot being melted; a drum rotatably mounted about the horizontal longitudinal axis thereof, the drum being mounted adjacent to the mould on the side of the wall shaping the internal surface of the ingot and coaxial with the wall; a base plate with a dummy bar fastened to the drum shell, the base plate being coupled to a power supply source; an electrode holder secured to the drum shell, the electrode holder being electrically insulated from the drum and coupled to the power supply source; at least one electrode, curvilinear in shape, set up in the electrode holder, encompassing a portion of the drum and having a clearance therewith to preclude electric contact between the drum and electrode; the drum, while turning, serving also as a carrier for withdrawing the ingot and as a device for securing the electrode holder and feeding the electrode into the mould melting space; and spring-biased rests rotatably mounted on the drum shell in the plane of rotation of the drum and securing the electrode and the ingot with respect to the pivotal axis of the drum.

4,020,894

PISTON MOLDING MACHINE

Frank L. McCoy, Troy, and Earl R. King, Ferndale, both of Mich., assignors to American Chain & Cable Company, Inc., Bridgeport, Conn.

Filed Mar. 19, 1976, Ser. No. 668,438

Int. Cl.² B22D *15/02, 17/26*

U.S. Cl. 164—343 **14 Claims**

1. In a piston molding machine, the combination comprising

a base,

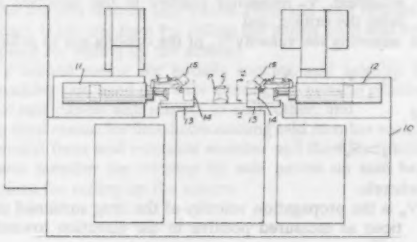
a pair of mold supports mounted on said base for movement in a straight line toward and away from one another,

means for moving said mold supports toward and away from one another,

a mold half mounted on each support,

said mold halves when juxtaposed providing a cavity for forming a piston,

a mold cap pivoted to each mold half about a transverse axis rearwardly of the face of the mold half,



and means extending between each cap and its respective mold support for pivoting said mold cap into position adjacent the mold half to define the top of the cavity and away from the mold half to provide clearance for removal of a piston formed in the mold.

4,020,895

METHOD AND APPAPATUS FOR THE ALTERNATE HEATING AND COOLING OF A HEAT EXCHANGER OF A HEATING AND COOLING APPARATUS

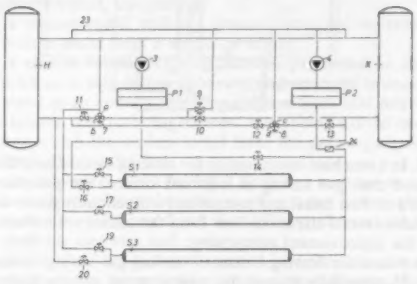
Otmar U. Schafer, 9 Pienzenauer Strasse, Munich 80, Germany

Filed Nov. 12, 1975, Ser. No. 631,234

Claims priority, application Germany, Nov. 12, 1974, 2453622

Int. Cl.² F25B *13/00*

U.S. Cl. 165—1 **7 Claims**



1. In a method of alternately heating and cooling heat exchanger means, such as a press or a reaction vessel, of a heating and cooling apparatus with thermal recovery, having a hot liquid source and a cold liquid source, in which, during the warm-up phase, the cool liquid returning from the heat exchanger, and, during the cool-down phase, the hot liquid returning from the heat exchanger, are delivered to one of at least two reservoirs, from which one reservoir, during the warm-up phase, hot liquid is taken for the hot liquid source, and, during the cool-down phase, cold liquid is taken for the cold liquid source, into which two reservoirs both during the warm-up phase and during the cool-down phase amounts of liquid of different temperature are taken from the heat exchanger, the improvement comprising: providing at least a first and second heat exchanger means, making the warm-up and cool-down phases of said second heat exchanger means out of step with the warm-up and cool-down phases of said first heat exchanger means by a fraction of the length of these

phases, and using the liquid from the first heat exchanger means during the warm-up phase for the preheating of the second heat exchanger means, and during the cool-down phase for the preliminary cooling thereof.

4,020,896

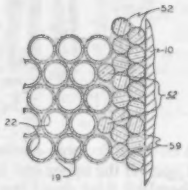
CERAMIC STRUCTURAL MATERIAL

Donald F. Mold, and Ronald G. Rice, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 491,661, July 25, 1974. This application Apr. 29, 1976, Ser. No. 681,352

Int. Cl.[3] C03C *29/00, 23/20;* **F28D** *17/00*

U.S. Cl. 165—10 **7 Claims**



6. A method of forming an integral structure of a low expansion glass-ceramic material having one or more coherent solid, reinforced portion and a gas conducting portion which comprises

a. bundling together in a desired configuration to define said solid, reinforced portion a plurality of axially elongated individual sinterable rods with their axes parallel and in wall-to-wall contact with each other, said rods being comprised of a thermally crystallizable glass composition of weight percent in the range:
SiO_2 68.6 – 75.8
Al_2O_3 16.8 – 21.3
Li_2O 3.7 – 4.44
NaO_2 0.1 – 0.55
K_2O 0 – 0.2
MgO 0 – 0.1
ZnO 0 – 1.7
TiO_2 1.4 – 2.0
ZrO_2 1.17 – 1.6
Cl_2 0 – 0.1
Sb_2O_3 0.3 – 0.5
F_2 0 – 0.1

b. filling the interstices between adjacent rods of said portion with additional sinterable glass of the composition set forth in step (a) and having substantially the same thermal expansion characteristics as the sinterable rods when both are subjected to a thermal treatment suitable for converting such glass to glass-ceramic,

c. tightly packing together a plurality of axially elongated tubes of thermally crystallizable glass of a composition within the range of step (a) in a desired matrix configuration and corresponding to said gas conducting portion of the structure, said tubes being adjacent to and against at least one side of said rod-frit structure portion, each of said tubes being sealed at its opposite ends and containing a heat expansible fluid medium and the tubes being essentially parallel to other tubes of the gas conducting portion and to the rods of the reinforced portion of the structure, the glass of said tubes having substantially the same thermal expansion characteristics as said rods and interstitially disposed glass when all are subjected to a thermal treatment for converting them to glass-ceramic,

d. constraining the tubes of said configuration in their position adjacent and against said rod configuration and against substantial movement in a direction normal to their parallel tube alignment,

e. subjecting said constrained rods, interstitial glass and tubes to a temperature sufficient to soften said rods, said interstitial glass and said tubes and cause said fluid medium in said end sealed tubes to expand the tubes into tight contact with adjacent tubes and said adjacent rod-interstitial glass structure bonding such tubes of the gas conducting portion to each other and to said solid portion as an integral structure, said temperature being in the range of 50° to 250° F above the annealing point of the glass of the said constituents of said integral structure in which temperature range the glass thereof nucleates during said fusion,

f. jointly heating said fused integral glass structure to a higher temperature than the temperature in step (e) in the range of 200° to 500° F above the said original annealing point of the glass,

g. finally heating said fused structure in a temperature range from 1800°–2300° F for completing crystallization thereof to a glass-ceramic having an average coefficient of lineal thermal expansion of about −18 to +15 ×0 10^{-7}/° C over the range of 0°–300° C, and thereafter cooling said structure, and

h. opening the opposite sealed ends of the tubes at a time subsequent to performing step (e), thereby providing the gas conducting portion of said integral structure.

7. An integral structural product of a low expansion glass-ceramic having one or more coherent, solid, reinforced portion and a gas conducting portion manufactured according to the method defined in claim **6.**

4,020,897

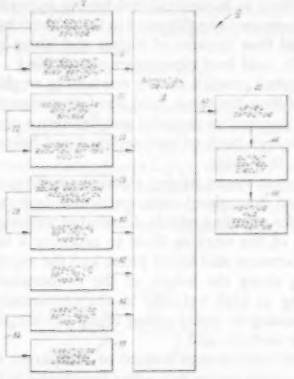
AUTOMATIC INTERIOR ENVIRONMENT CONTROL

William L. Enter, 7705 Aquaclear Road, Mustang, Okla. 73064

Division of Ser. No. 431,682, Jan. 9, 1974, Pat. No. 3,905,153. This application Aug. 29, 1975, Ser. No. 608,884

Int. Cl.[3] F24F *11/00;* **G05D** *23/27*

U.S. Cl. 165—12 **11 Claims**



1. A temperature control system for automatic temperature control of indoor environs, comprising:

temperature sensing means including a temperature set-point adjustment potentiometer for providing a first electrical output indicative of desired temperature set-point;

nocturnal modify means including a set-point adjustment means for sensing the amount of incident sunlight during a daytime period and providing a second electrical output proportional to a nocturnal set-point temperature modification;

instantaneous sunlight sensing means including set-point voltage adjustment means for providing a third electrical output indicative of incident sunlight;

summing means receiving each of said first, second and

third electrical outputs to provide a summed output voltage;

voltage level comparator means receiving said summed output voltage at its input and providing at the output thereof a control voltage; and

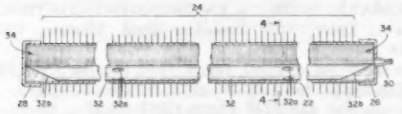
output control circuitry energized by said output control voltage to control energization of heating and cooling apparatus to maintain the temperature of said indoor environs in accordance with the set-point adjustments.

4,020,898

HEAT PIPE AND METHOD AND APPARATUS FOR FABRICATING SAME

George M. Grover, Los Alamos, N. Mex., assignor to Q-Dot Corporation, Dallas, Tex.

Filed Feb. 14, 1973, Ser. No. 332,417
Int. Cl. F28d *15/00*
U.S. Cl. 165—105 24 Claims



1. In a thermal transfer system that includes heat pipe means inclined to horizontal and having opposite evaporator and condenser sections disposed in thermal exchange relationship in fluid flow streams of higher and lower temperatures, respectively, said heat pipe means comprising

an elongated conduit means containing working fluid partially filling the same, said conduit means being of thermally conductive material and defining a passage extending through both of said sections and being many times longer than wide,

said conduit means having internal capillary structure distributed throughout said evaporator and condenser sections for effecting widely distributed wicking of the liquid phase of the working fluid to promote a large interface area between said liquid phase and the vapor phase originating along the length of the evaporator section and flowing at high velocity to the condenser section and condensing to liquid phase along the length of the condenser section, and

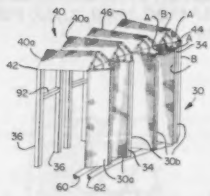
elongated duct means formed of a separate element from said conduit means extending lengthwise in lower passage regions of the evaporator and condenser sections of said conduit means and in substantially thermally isolated relation to said conduit means, said duct means having port means communicating with said passage near the ends of the evaporator and condenser sections to receive liquid working fluid swept towards the low temperature region of the passage by said unidirectional flow of vapor phase and to pass such liquid working fluid by gravity to the evaporator section where backflow of liquid phase due to said unidirectional flow of vapor phase distributes the liquid phase along lower regions of the evaporator section and the internal capillary structure thereof distributes the liquid phase circumferentially throughout large areas of the evaporator section.

4,020,899

ATMOSPHERIC COOLING TOWER WITH DRY-TYPE HEAT EXCHANGERS

Luc Felix Marie-Louis Ghislain Langerock, Brussels, Belgium, assignor to Hamon-Sobelco S.A., Belgium

Filed May 6, 1975, Ser. No. 575,029
Claims priority, application Luxembourg, Nov. 27, 1974, 71376
Int. Cl.² F28B *1/02*
U.S. Cl. 165—110 8 Claims



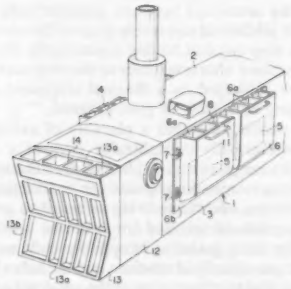
1. An air cooled circular dry-type cooling tower assembly comprising a tower open at the upper end for the discharge of heated air, a peripheral air inlet about the base of the tower and a plurality of dry-type heat exchange assemblies mounted in said tower characterized in that the heat exchange assemblies comprises a first set of heat exchange units mounted within the tower in a vertically extending array on a circle concentric to the periphery of the tower, and a second set of heat exchange units mounted in a generally horizontal plane and extending in the annular air passage between from the tops of said first set of heat exchange units and the wall of the tower.

4,020,900

DEVICE FOR VENTILATING COOLING AIR OF CONSTRUCTION

Kunio Kitagawa, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed June 25, 1974, Ser. No. 482,852
Claims priority, application Japan, Jan. 31, 1974, 49-12431[U]
Int. Cl.² F28F *13/00*; B60K *11/04*; F01P *7/10*
U.S. Cl. 165—135 7 Claims



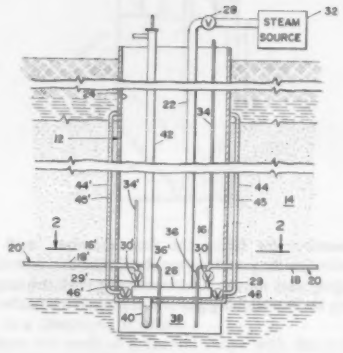
1. A device for ventilating cooling air for cooling a coolant of an engine of a construction vehicle having a water cooled engine within a housing and for reducing the noise of the engine emitted through said device, said device comprising at least one inlet and outlet means mounted on the exterior of said housing for directing cooling air, which dissipates the heat of the coolant, vertically with respect to the body of the vehicle, said inlet and outlet means each comprising a plurality of ducts formed by a plurality of parallel reinforcing ribs and noise-absorbing material which covers the inner surface of

said ducts whereby the noise of said engine passing through said inlet and outlet means is substantially reduced.

4,020,901
ARRANGEMENT FOR RECOVERING VISCOUS PETROLEUM FROM THICK TAR SAND

Peter Pisio, and Charles F. Kirkvold, both of Calgary, Canada, assignors to Chevron Research Company, San Francisco, Calif.

Filed Jan. 19, 1976, Ser. No. 650,571
Int. Cl.² E21B *43/24*
U.S. Cl. 166—50 **4 Claims**



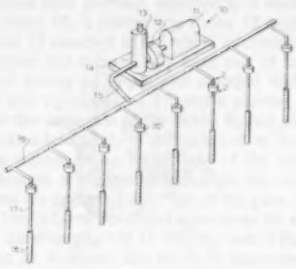
1. An arrangement for recovering viscous oil from a tar sand formation having a large vertical dimension comprising a substantially vertical shaft extending through a tar sand formation, a shaft lining on the wall of said shaft separating the interior of said shaft from said formation, a first opening in the lower portion of said shaft lining, at least one lateral hole extending into said formation through said first opening, a plurality of tubular members in said lateral hole to provide both a closed loop flow path for fluid flow from said shaft into and out of said hole and a separate flow path for production fluids from said hole into said shaft, a steam source, conduit means connecting said steam source to the tubular members forming said closed loop flow path, a second opening in said shaft lining, a steam injection conduit having an opening for injecting steam into said formation extending through said second opening in said shaft liner into said formation and conduit means connecting said steam source with said steam injection conduit.

4,020,902
WELL POINT SYSTEM

Joseph M. Valdespino, Orlando, Fla., assignor to R. L. Gould and Stanley Hobbs, both of Winter Park, Fla., part interest to each

Filed July 3, 1975, Ser. No. 593,006
Int. Cl.² E02B *11/00*; E21B *43/00*
U.S. Cl. 166—52 **9 Claims**

1. A well point system comprising in combination:
a pumping means;
a plurality of well points;
a plurality of risers attached to said well points and operatively coupled to said pump means for connecting each said well point to said pumping means;
a plurality of valves each being coupled to a riser for substantially cutting off individual risers in the absence of the flow of water, each said valve having a casing with an input portion connected to the well point side of a riser and an output portion connected to the pump side of a riser, said valve having a float located in said casing in said input portion with said float being lifted in said casing by a liquid therein, and said valve also having a float biasing means operatively connected to said float for biasing said float in one direction and a valve port sealing means located in said casing in said output portion thereof being operatively secured to said float and movable therewith to substantially seal said port in said casing in the absence of liquid in said casing in the absence of



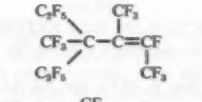
liquid in said casing responsive to said float biasing means; and
air bleed means located adjacent said valve port for allowing air to escape past said sealing means once said valve sealing means is closed, whereby said air passage prevents complete sealing of said valve port to allow rising liquid to unseal the valve sealing means.

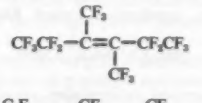
4,020,903
FIRE-FIGHTING FOAM COMPOSITIONS

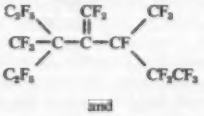
Harold Crosbie Fielding; John Hutchinson, and Samuel John Webster, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 195,507, Nov. 3, 1971, abandoned, which is a continuation of Ser. No. 818,081, April 21, 1969, abandoned. This application Mar. 15, 1976, Ser. No. 667,013
Claims priority, application United Kingdom, Apr. 29, 1968, 20214/68; May 7, 1968, 21613/68; Sept. 27, 1968, 46013/68; Oct. 25, 1968, 50787/68
Int. Cl.² A62B *1/12*
U.S. Cl. 169—47 **2 Claims**

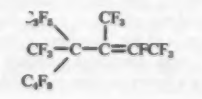
1. A method of fighting fires which comprises applying to the fire a foam produced from an aqueous composition comprising as a surface-active agent the residue of a branched oligomer of tetrafluoroethylene $(C_2F_4)_n$ wherein n is 4, 5, or 6 having a hydrophilic group attached to the residue of the oligomer, said oligomer having at least three CF_2 groups and being characterized by a formula selected from the group consisting of:







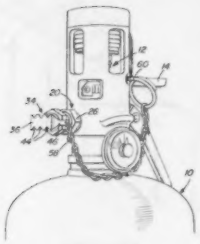
and



4,020,904
DISPERSION NOZZLE WITH REMOVABLE DISPERSION ELEMENT

Joseph S. DePalma, P.O. Box 353, Closter, N.J. 07624

Filed Dec. 3, 1975, Ser. No. 637,154
Int. Cl.² A62C *13/24*
U.S. Cl. 169—74 2 Claims



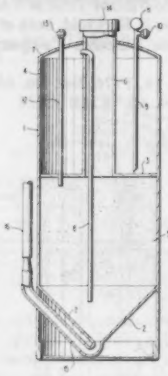
1. In combination with a fire extinguisher of the type including a discharge port for discharging a fire extinguishing material under pressure, a nozzle having a discharge passage extending therethrough having inlet and outlet ends, said nozzle being supported from said fire extinguisher with said inlet end communicating with said port, said passage being adapted to discharge a stream-type discharge from said outlet end, and a dispersion element removably supported from said nozzle in registry with said outlet end for dispersing said stream-type discharge, said fire extinguisher including automatic thermal responsive discharging means and manually operable discharging means, said manually operable discharging means including a manual operator shiftable between active and inactive positions, a first axially removable pin releasably retaining said manual operator in said inactive position, said dispersion element being removably secured to said nozzle against removal therefrom by means of a second axially removable pin, an elongated flexible tether member tethering said pins extending transversely through said nozzle passage together, said pins generally paralleling each other and being axially removable in the same direction whereby continued pulling on one pin in the direction effecting its removal will also result in removal of the other pin, said dispersion element, upon removal of the corresponding pin, being freely disengageable from said nozzle and spring means operably connected between said nozzle and said element yielding biasing the latter outwardly from said nozzle in the direction in which said outlet end of said passage opens.

4,020,905
CONSTRUCTION OF FIRE EXTINGUISHERS

Armando Francioni, Apartado Chacao No. 61.278, Caracas, Venezuela (106)

Filed Dec. 8, 1975, Ser. No. 638,544
Claims priority, application United Kingdom, June 20, 1975, 26405/75
Int. Cl.² A62C *35/50*
U.S. Cl. 169—76 4 Claims

1. In a gas-operated extinguisher comprising a housing containing a first chamber for a charge of extinguishing material and a second chamber for an impelling charge of gas under pressure, said first chamber including a bottom wall defined by an inverted cone, discharge conduit means communicating with said first chamber at the apex of said cone, and a first tube having one end in communication with said second chamber and the other end being directed downwardly toward said bottom wall for impelling a charge of extinguishing material into said discharge conduit means, said first chamber including a lower section extending across the lower interior of the housing to contain the charge of extinguishing material and an upper section of narrower cross-section extending upwardly to provide an expansion space when said material is being discharged, said upper section communicating with the exterior of the housing and being provided with a

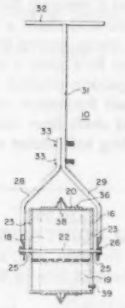


closure member for filling the first chamber, said second chamber surrounding said upper section of the first chamber and including tube means communicating with the exterior of the housing for introducing gas under pressure into the second chamber.

4,020,906
GARDEN MARKER

Leslie H. Wells, Auburn, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 3, 1975, Ser. No. 619,484
Int. Cl.² A01B *1/00, 29/04;* A01C *5/02*
U.S. Cl. 172—350 1 Claim



1. A tool for forming a groove in a garden in which to plant seeds, said tool comprising

a cylindrical drum rotatably mounted to a yoke of a handle shank, and

a one-piece projecting collar member detachably mounted about the exterior of the circular rolling surface of the drum, in which the collar member is of a general tubular shape formed with a continuous annular projecting V-shaped flange about its periphery, said flange bounded by a continuous tubular rim section, with,

a plurality of L-shaped slots formed in said rim section and each extending to an exterior edge of said rim section and said collar, together with

rivets fitted to the said drum that radially project from the exterior rolling surface of the drum, said rivets each

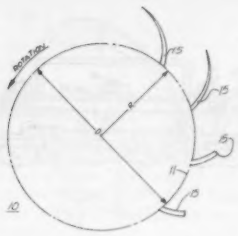
aligned to detachably engage one of said slots of the collar member in the assembled condition.

4,020,907

ROTARY GROUND BREAKER, SOIL PULVERIZER AND PASTURE RENOVATOR

Oral W. Luck, Gassville, Ark., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 27, 1975, Ser. No. 608,175
Int. Cl.² A01B *29/04*
U.S. Cl. 172—554 1 Claim



1. A rotatable cylinder fitted with tines for use in breaking up soil, said cylinder fitted with means for fastening to a tractor hitch so that the cylinder freely rotates when drawn by a tractor in a direction, in which

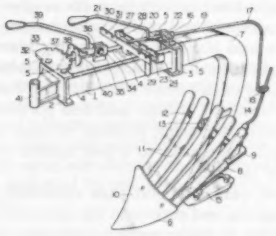
the tines are each of a curved shape with the pointed free end of the tines facing the direction of cylinder rotation, with each tine formed in the shape of an arc, the radius of which is one-third the diameter of the cylinder, with the center of curvature of said arc lying on the surface of the cylinder.

4,020,908

REVERSIBLE PLOW

Makoto Kobayasi, Ueda, and Minoru Hiramoto, Maruko, both of Japan, assignors to Matsuyama Plow Mfg. Co., Ltd., Japan

Filed Dec. 18, 1975, Ser. No. 642,064
Int. Cl.² A01B *15/20*, *15/02*
U.S. Cl. 172—742 3 Claims



1. A reversible plow comprising:

a regulating frame 1 having a front frame member 2, a back frame member 3, and side frame members 4 spaced parallel to each other, both ends of said side frame members 4 being rotatably connected to the front and the back frame members so as to form a movable parallelogram;

a plow body 6 attached to the back frame member 3 of the regulating frame 1;

a reversing rod 17 rotatably attached to the back frame member 3 of the regulating frame 1; and

a fixing member 24 supported by said both side frame members 4 of the regulating frame 1 and being parallel to the back frame member 3 and having a plurality of engaging portions 28 with which the front end portion of the reversing rod 17 is detachably and selectively engaged;

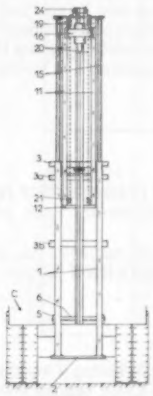
said plow body 6 comprising an arm 7 having a front end fixed to the back frame member 3, a sleeve 8 fixed to the bottom end of said arm 7, a rotary shaft 9 rotatably mounted in said sleeve 8, a plow share 10 fixed to a front end of said rotary shaft 9, a plurality of plate bars 11 having bottom ends pivotally attached to a back side of said plow share 10, a connection frame 12 engaging an engaging rod 13 attached to the arm 7, a reversing rod 14 having a lower end secured to a back end of the rotary shaft 9 and having an upper end engaged with a rear portion of said reversing rod 17, and a plowing base 15 attached to the underside of the sleeve 8; said plow body 6 being located selectively at the back and on the centerline of the tractor or on either side of the tractor by rotating through a predetermined angle the regulating frame 1, and the operating direction of the plow share 10 and plate bars 11 can be varied selectively by engaging selectively the reversing rod 17 with any one of the engaging portions 28, in a state that the front frame member 2 of the regulating frame 1 is connected with the tractor.

4,020,909

PORTABLE EARTH DRILLING APPARATUS

Antonin Airaudo, 5, boulevard Notre-Dame, 13006 Marseille, France

Filed Nov. 26, 1975, Ser. No. 635,705
Claims priority, application France, Nov. 26, 1974, 74.41057
Int. Cl.² E21C *11/02*
U.S. Cl. 173—147 16 Claims



1. Drilling apparatus comprising an extensible mast including a fixed lower ramp including a pair of posts with cross-bracing means, an upper movable slide slidably mounted on said lower ramp between retracted and extended positions, said movable slide including a pair of posts with cross-bracing means, a rotation head slidably mounted on said upper slide for movement along the length of said slide, means for synchronizing movements of extension and retraction of the slide with respective ascending and descending displacement of the rotation head, the synchronizing means comprising two double-acting jacks connecting the lower portion of the fixed ramp to the upper portion of the movable slide, a first pair of chains, a pulley mounted on the upper extremity of each of the posts of the movable slide and having a respective chain wound thereon, each chain having one end fixed to the rotation head and an opposite end fixed to the cross-bracing means connecting the posts of the fixed ramp, a second pair of chains, a second pulley mounted at the lower extremity of each of the posts of said movable slide and having a respective

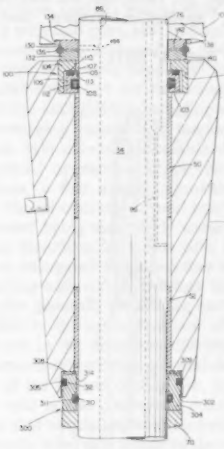
chain of said second pair wound thereon, each of the second chains being fixed at one end to the rotation head and at the other end to the cross-bracing means connecting the posts of the fixed ramp, said jacks having axes of extension and retraction, said pulleys having axes of rotation, said axes of said jacks and said pulleys being disposed in a common plane.

4,020,910

SEALING BETWEEN RELATIVELY ROTATING MEMBERS IN BORING APPARATUS

Carl R. Peterson, Boxford, and Allan T. Fisk, Salem, both of Mass., assignors to Rapidex, Inc., Gloucester, Mass.

Filed May 19, 1976, Ser. No. 688,042
Int. Cl.² E21B 9/22; F16J 15/34
U.S. Cl. 175—345 **25 Claims**



1. In boring apparatus having a working member mounted for rotation on a lubricated bearing about a shaft member, said apparatus being of the type in which substantial radial and axial relative motion between said members occurs in response to radial and axial loading conditions encountered by said working member during operation in an abrasive laden external environment, that improvement comprising a seal assembly between said members for sealing said bearing from said environment while accommodating said radial and axial relative motion, said seal assembly comprising

a seal carrier mounted in a space between said members,

a dynamic seal element supported between said carrier and one of said members to form a dynamic seal therebetween, and

a static seal element supported between said carrier and a radially extending surface of the other of said members, said dynamic seal element being axially slidable along said one member to accommodate said axial relative motion,

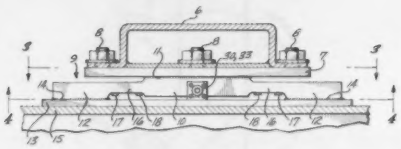
said static seal element being deformable and radially slidable along said surface to accommodate said radial relative motion.

4,020,911

LOAD CELL SCALE

David C. English, Seattle; Jerry L. McCauley, Renton, and Godfrey A. Holmstrom, Issaquah, all of Wash., assignors to Structural Instrumentation, Inc., Tukwila, Wash.

Continuation of Ser. No. 387,502, Aug. 10, 1973, abandoned, which is a continuation of Ser. No. 268,664, July 3, 1972, abandoned. This application June 14, 1974, Ser. No. 479,474
Int. Cl.² G01G 19/08
U.S. Cl. 177—136 **2 Claims**



1. A system for measuring the weight of a load carried by a truck having planar load supporting members above opposing planar portions on the underlying frame of the truck,

load cells positioned between said load supporting members and planar portions and being operatively connected to weight indicating means for providing an indication of the sum of the individual loads carried by said load cells, each of said load cells comprising:

a single, elongated, rectangular measurement beam having two end portions separated from a central portion by respective, relatively thin intervening portions, said end portions being relatively thick and projecting below the central and intervening portions of said beam such that said central and intervening portions can deflect downwardly when said end portions are supported on a planar surface and a load is applied to said central portion, and said central portion being relatively thick and projecting above the end and intervening portions of said beam with the top surface of said central portion being welded to a respective said planar load supporting member thereby spacing said planar load supporting member above the end portions of said beam such that said load supporting member does not contact said end portions when said central and intervening portions of said beam deflect downwardly responsive to a load applied to the central portion of said beam;

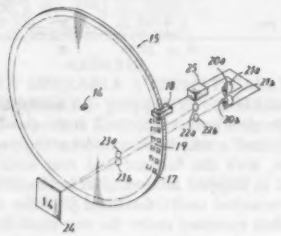
an elongated, planar support plate extending beneath said beam from one end portion to the other end portion, said beam having its lower surface contacting the respective planar portion of said underlying frame and its upper surface contacting the lower surface of said beam end portions, said end portions being welded to said support plate so that said measurement beam constitutes a fixed ended beam forming an S-shaped curve upon deflection; and

a pair of strain gauges secured to the underside of each intervening portion of said beam, said strain gauges being spaced apart from each other such that as the center portion of said beam deflects, the portion of said beam contacting one strain gauge undergoes compression while the portion of said beam contacting the other strain gauge undergoes tension.

4,020,912
INDICATION APPARATUS WITH DISCRETE ILLUMINATED PROJECTIONS

Masamichi Hino, Suita; Kou Fukui; Tsuneo Kashitani, both of Osaka; Kazuyoshi Enomoto, Kawachinagano, and Setsuo Hijikata, Yao, all of Japan, assignors to Kubota Ltd., Osaka, Japan

Filed May 10, 1976, Ser. No. 684,921
Claims priority, application Japan, Feb. 14, 1976, 51-15576; Feb. 14, 1976, 51-15577; Feb. 14, 1976, 51-15578; Feb. 14, 1976, 51-16921
Int. Cl.² G01G *23/32, 3/14;* **G01D** *5/34;* **G09F** *9/00*
U.S. Cl. 177—178 **18 Claims**



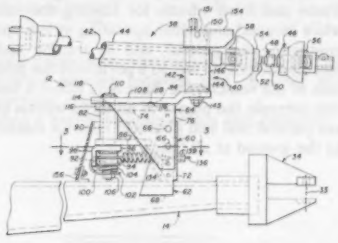
1. An indicating apparatus, comprising:
a scale plate movable in a predetermined direction,
means for producing a physical quantity,
means responsive to a physical quantity produced by said physical quantity producing means for displacing said scale plate by an amount correlated with said physical quantity,
said scale plate having characters successively arranged thereon in said direction of movement which represent numerical values stepwise correlated with said physical quantity, said scale plate also having displacement detecting mark means arranged thereon in said direction of movement so as to be correlated with the successive arrangement of said numerical value representing characters,
a plurality of light sources opposed to said scale plate and arranged to be individually correlated with only a plurality of predetermined adjacent ones among said numerical value-representing characters,
power source means for energizing said plurality of light sources,
means responsive to said displacement detecting mark means for producing a signal representing the displacement of said scale plate, and
energization control means responsive to said displacement signal for selectively energizing only one of said plurality of light sources thereby to selectively indicate one of said plurality of adjacent numerical value representing characters correlated with said physical quantity, whereby the numerical value correlated with said physical quantity is stepwise indicated by said numerical value representing character.

4,020,913
TONGUE-MOUNTED YIELDABLE PTO DRIVELINE SUPPORT

George E. Yatcilla, Newton, Kans., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Sept. 15, 1975, Ser. No. 613,135
Int. Cl.² F16D *3/00*
U.S. Cl. 180—14 R **6 Claims**

1. An improved means mounted on a tongue of a draft implement having an articulated input driveline, said means normally supporting said driveline in a predetermined longitudinally extending position for operative drive connection with a power shaft of a tractor or the like which tows the implement through an articulation connection with the implement tongue, said supporting means comprising:
a support mounted on said tongue;
an element mounted to said support for rotational movement relative thereto about a generally upright axis;
a generally horizontal arm being rigidly connected at one end to an upper portion of said rotatable element for movement therewith, said arm at an opposite end being interconnected to and supporting said driveline; and
a pair of tension springs interconnecting and extending generally between said support and a lower portion of said rotatable element so as to normally maintain said

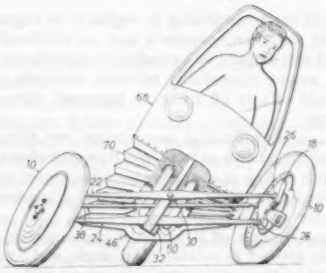


element and thereby said arm in a centered position such that said arm will support said driveline in said predetermined longitudinal position, each of said springs being yieldable to allow rotation of said element such that said arm will pivotally move laterally and allow lateral movement of said driveline therewith to accommodate sharp turns of the tractor relative to the implement, said springs being interconnected with opposite sides of said rotatable element such that one of said springs yieldably resists rotational movement of said element in one direction and the other of said springs yieldably resists rotational movement of said element in a direction opposite to said one direction.

4,020,914
STABILIZED THREE-WHEELED VEHICLE

Wolfgang Trautwein, 3529 Carroll Circle, Huntsville, Ala. 35801

Filed Feb. 23, 1976, Ser. No. 660,729
Int. Cl.² B62D *61/06*
U.S. Cl. 180—25 R **10 Claims**



1. In combination with a motorcycle-type frame, engine, and rear drive wheel configuration, the improvement comprising:
first and second spaced front wheels, each having a wheel mounting support;
parallelogram coupling means comprising first and second, spaced one above the other, cross members pivotally interconnected between said wheel mounting supports of

said front wheels, and each cross member being centrally and pivotally attached to said frame;

a foot resting platform extending rearward from the lower of said cross members on each side of and spaced from the lower portion of said frame;

connecting means for pivotally connecting the rear of said platform to said frame; and

steering means pivotally supported by said frame, and including means pivotally connected to said wheel mounting supports of said front wheels for rotating said wheel mounting supports and said front wheels in unison about axes perpendicular to the spin axes of the wheels;

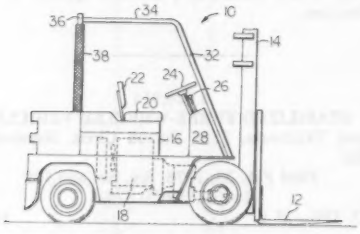
whereby a rider may apply a stabilizing force between the frame and front wheels for holding the vehicle upright while stopped and while operating at low speeds without contacting the ground, and by leaning and applying a force by one of his feet to a portion of the platform on one side of the vehicle, the rider may effect a banking operation wherein the planes of all three wheels of the vehicle are parallel and said platform remains essentially parallel to the ground at all times.

4,020,915

EXHAUST SYSTEM FOR LIFT TRUCKS

William E. Darnell, Mentor, and Richard J. Malecha, Cleveland, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Sept. 2, 1975, Ser. No. 609,887
Int. Cl.² B60K *13/04, 13/06*
U.S. Cl. 180—64 A **2 Claims**



1. In a lift truck comprising an engine in an engine housing, an exhaust stack, an operator's seat, an overhead structure above said seat defining an operator's compartment and a load engaging means controllably movable vertically adjacent a forward end of said lift truck an improved exhaust system, comprising:

a first conduit affixed at an upstream end thereof to said engine to receive exhaust gas flow therefrom, said first conduit ending at a nozzle at a downstream end thereof;

a muffler intermediate said engine and an upstream end of said first conduit;

a second conduit of larger inlet cross section than said nozzle aligned to receive said nozzle and to accept gas flow therefrom along with ambient air and conduct said gas flow and said air to said exhaust stack, said stack comprising a support for said overhead structure, said second conduit being affixed to said housing and said nozzle floating freely relative to said second conduit; and

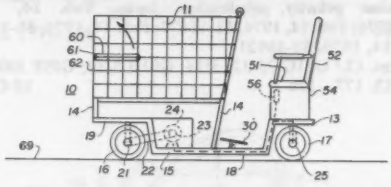
a unitary multiply perforate generally cylindrical member surrounding said support for protecting an operator of said vehicle and others in the area of operation of said vehicle from harm caused by heating up of said support caused by gas flow therethrough.

4,020,916

SELF-PROPELLED SHOPPING CART

Roy A. Noble, Springville, Pa., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Dec. 9, 1975, Ser. No. 639,211
Int. Cl.² B60L *1/18;* B60P *3/00*
U.S. Cl. 180—65 R **1 Claim**



1. A motor driven shopping cart comprising a platform on which an open basket is located at the forward section of the platform and a seat is mounted on the rear section of the platform, with the forward and rear ends of the platform elevated in stepped fashion to accommodate a pair of front wheels mounted under the front platform end and a pair of rear wheels mounted under the rear platform end, with a first pair of said wheels linked to a motor mounted on the platform for rotating said wheels and the second pair of wheels linked to a steering mechanism for steering said wheels, in which an open space is provided above the platform between the basket and the seat for positioning of the legs of a person seated on the seat facing the basket, with a pair of pivotably mounted foot pedals mounted on the platform, in which

a first of said foot pedals is linked to the control circuit of the motor, and the second of said foot pedals is linked to the steering mechanism of the wheels,

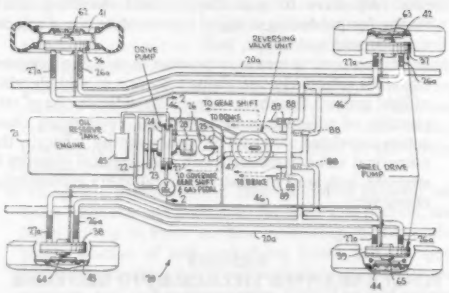
each said foot pedal pivotally mounted by an individual hinge pin to the platform to be pivotable in a vertical plane, along the longitudinal axis of the shopping cart.

4,020,917

POSITIVE HYDRAULIC DIRECT DRIVE FOR VEHICLES

Sigmund P. Lutterschmidt, R.D. No. 1, Kutztown, Pa. 19530

Filed Nov. 7, 1975, Ser. No. 629,965
Int. Cl.² B60K *17/10;* F01C *1/00;* F03C *3/00;* F04C *1/00*
U.S. Cl. 180—66 R **7 Claims**



1. A fluid rotary vanes pump, comprising: a stationary cylindrical stator; a cylindrical rotor co-axially mounted within said stator, vanes being mounted on said rotor for sliding movement within radially extended slots provided therein; intake and discharge openings communicating with the interior of said stator; blow-by prevention means on said stator lying between said openings extending toward and bearing against the outer surface of said rotor; an inner surface of said stator being spaced from said outer surface to define a fluid chamber; eccentric grooves disposed in opposing side walls of said

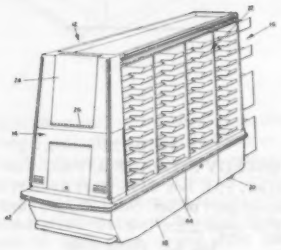
stator, said vanes having lugs thereon extending into said grooves, said lugs each being formed of a fixed lug part and a telescoping movable lug part with means between said parts urging them outwardly of one another into intimate contact with opposing walls of said grooves, said vanes thereby cooperating with said grooves so as to be guided therealong for causing gradual vane movement from a fully retracted position between said openings to a fully extended position bearing against said inner surface as said vanes move away from said intake opening, and from said fully extended position back to said fully retracted position as said vanes move toward said discharge opening, whereby intake and discharge chambers are defined near said intake and discharge openings, respectively, facilitating a pumping action as said rotor rotates.

4,020,918

MANUALLY OPERABLE AUTOMATICALLY CONTROLLED VEHICLE WITH POWER STEERING

Robert W. Houskamp, and Carl DeBruine, both of Grand Rapids, Mich., assignors to Lear Siegler, Inc., Santa Monica, Calif.

Filed Dec. 31, 1975, Ser. No. 645,710
Int. Cl.² B62D *5/04*
U.S. Cl. 180—79.1 **7 Claims**



1. In an automatically controlled, manually steerable vehicle having a steerable wheel and servo means for power steering said steerable wheel;
means for detecting a sensible guide line;
first circuit means for applying a steering signal to said servomotor responsive to deviation of the vehicle from the sensible line;
a manually operable steering element;
means coupling the steering element to the steerable wheel for manually steering the steerable wheel; and
switch means for disabling the first circuit means for manual steering of the vehicle;
the improvement which comprises:
torque sensing means on said steering element coupling means for detecting application of torque thereto and for generating an output signal representative of the direction of torque on the steering element coupling means; and
second circuit means for driving said servo means responsive to the output signal from the torgue sensing means so as to null the signal from the torque sensing means.

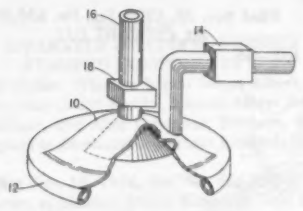
4,020,919

SEISMIC SOURCE WITH NO REACTION MASS

Robert A. Broding, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Nov. 14, 1975, Ser. No. 632,050
Int. Cl.³ G01V *1/14*
U.S. Cl. 181—119 **5 Claims**

5. A method of generating seismic signals using a modulated partial vacuum to apply vibrations to the earth's surface, said method comprising:
a. placing a chamber structure having a large opening in a position with said opening adjacent to the earth's surface;



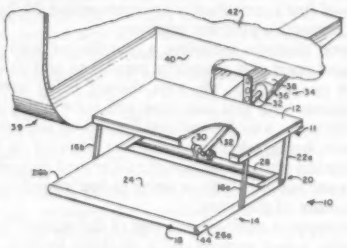
b. positioning a compliant, vibration-isolating means around said chamber opening between said chamber and the earth's surface; and
c. modulating a partial vacuum within said chamber.

4,020,920

RETRACTABLE TRANSIT COACH STEP

John D. Abbott, 17469 Parker Road, Castro Valley, Calif. 94546

Filed June 28, 1976, Ser. No. 700,088
Int. Cl.² B60R *3/00*
U.S. Cl. 182—19 **3 Claims**

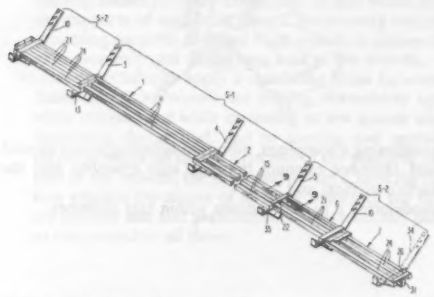


1. A retractable step comprising
a fixed member,
a movable step member,
a parallelogram linkage pivotally connecting said movable step member to said fixed member comprising
a pair of front linkage members pivotally connected proximate the front of said fixed member, and
a pair of rear linkage members pivotally connected proximate the rear of said movable step member,
a torque member fixedly attached proximate the rear of said movable step member,
a clevis fixedly attached to said torque member and depending upwardly therefrom,
means for moving said movable step member toward and away from said fixed member, having one end of said means connected to said fixed member and the other end of said means connected to said clevis proximate the upwardly depending end thereof, and
a second torque member fixedly attached to one pair of said parallelogram linkages and pivotally connected to said movable step member.

4,020,921
ROOFER'S STAGING

Eugene Rawlings, 1044 Lincoln Ave., Prospect Park, Pa. 19076

Filed Nov. 28, 1975, Ser. No. 636,061
Int. Cl.² E04G 3/12
U.S. Cl. 182—45 21 Claims



1. A roofer's staging comprising:

a first platform including a plurality of first beams spaced apart and extending parallel to and co-extensive with one another, the tops of the beams being co-planar and constituting a platform for a roofer;

a first support adjacent one end of said first beams and having a roof section and a platform section, the roof section being adapted to engage a roof for mounting the staging thereon and the platform section engaging and supporting said first beams;

a second support adjacent the opposite end of said first beams and having a roof section and a platform section, the roof section being adapted to engage a roof for mounting the staging thereon and the platform section engaging and supporting said first beams;

means respectively at said one end and at said opposite end of said first beams fixedly interconnecting the beams and the respective platform sections;

a second platform including a plurality of second beams spaced apart and extending parallel to and co-extensive with one another, the tops thereof being substantially co-planar with first said tops and constituting a second platform for a roofer and said first beams and said second beams being telescoped together at least in the area above the platform section of said second support and the first and second platform being in-line whereby one is the extension of the other;

a third support adjacent one end of the second beams and having a roof section and a platform section, the roof section being adapted to engage a roof for mounting the staging thereon and the platform section engaging and supporting said second beams; and

means at said one end of said second beams fixedly interconnecting the beams with the platform section of said third support.

4,020,922
FILTER CATCHER

Dan E. Klasel, 5085 Woodale, Memphis, Tenn. 38118

Filed Jan. 8, 1976, Ser. No. 647,626
Int. Cl.² F16N 31/00
U.S. Cl. 184—1.5 2 Claims

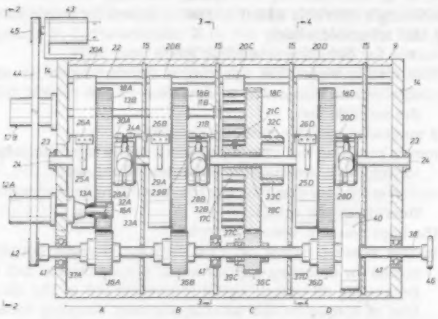
1. A filter catcher, comprising in combination, an adapter for fitting around a lower end of an engine block, and a disposable plastic bag attachable to said adapter, said bag serving to catch dripping oil and an oil filter, said adapter having an annular groove around its outer side for receiving an upper edge of said bag; and a tape of fabric material secured to an inner side of said bag a second tape of fabric material being secured to an outer side of said bag, said tapes being aligned in position with each other and forming protective cushions for the portion of said bag that is between said inner and said outer tapes, said outer tape protecting said bag portion from a

wrench applied therearound, and said inner tape protecting said bag portion from a surface of said oil filter while being squeezed by said wrench and prevent tearing said bag by said oil filter surface.

4,020,923
ENERGY STORAGE APPARATUS

Robert N. Taylor, P.O. Box 5395, Port Arthur, Tex. 77640

Continuation-in-part of Ser. No. 480,967, June 19, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,314
Int. Cl.² F03G 1/00
U.S. Cl. 185—11 7 Claims



1. An energy storage apparatus having a plurality of units for transmitting input power from electric motors to an output shaft, each unit comprising:

a frame;

an electric motor mounted in said frame;

a main gear rotatable in response to said motor;

a flat spiral spring having one end secured to said main gear, for storing energy upon rotation of said main gear;

means for selectively engaging an output shaft with said main gear; and

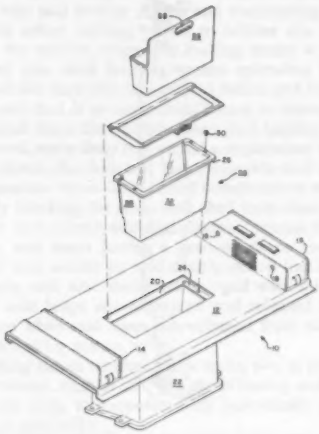
a motor control switch engageable with said spring for sensing the contraction and expansion of said spring and for activating and deactivating said motor in response to preselected positions of contraction and expansion of said spring.

4,020,924

WINDOW STRUCTURE FOR OPTICAL CODE READING SCANNERS

Paul A. Conrotto, San Jose, and Henry W. Jones, San Leandro, both of Calif., assignors to Spectra-Physics, Inc., Mountain View, Calif.

Filed Nov. 3, 1975, Ser. No. 628,326
Int. Cl.² E04H 3/04
U.S. Cl. 186—1 A 10 Claims



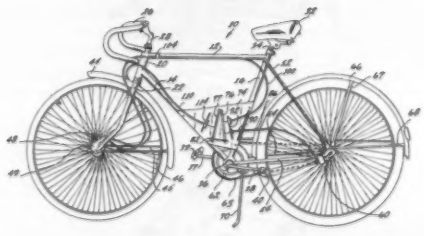
1. A window structure for optical code reading scanners of the type having a generally horizontal slide over which articles bearing coded labels are passed, means forming an aperture in the slide, means forming a box having dimensions for fitting about said aperture and for forming sealing engagement with the same, said box being open at its upper end and closed on all other sides by walls, one of said walls having a means forming a transparent window therein for permitting transmission of a laser scan pattern therethrough, said window lying below said aperture and making an angle thereto.

4,020,925

BICYCLE BRAKING SYSTEM

John W. Ryan, 674 Nimes Road, Los Angeles, Calif. 90024, and James D. Moore, 6810 Locklenna Lane, Palos Verdes, Calif. 90274

Filed Nov. 10, 1975, Ser. No. 630,309
Int. Cl.² B62L 3/08
U.S. Cl. 188—24 10 Claims



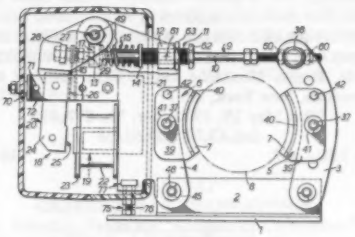
1. In a braking system for a two-wheeled vehicle having a front wheel coaster brake and a rear wheel coaster brake having a reaction torque arm, means for actuating the rear brake, means responsive to actuation of the rear brake for actuating the front brake and feedback means for transmitting an impulse resulting from actuation of the front brake to apply modified braking to the front brake.

4,020,926

BRAKE APPARATUS INCLUDING PRESSED OR STAMPED COMPONENTS

John Reginald Slatter, Windsor Berks; James Albert Jackson, Hyde Heath; John Gedny Brooks, Heston; Albert John Clark Ward, Cookham, and Alan Dewhurst, Denham, all of England, assignors to Dewhurst & Partner Limited, Hounslow, England

Filed Feb. 10, 1976, Ser. No. 656,937
Claims priority, application United Kingdom, Feb. 12, 1975, 6062/75
Int. Cl.² F16D 49/16
U.S. Cl. 188—75 8 Claims



1. Brake apparatus for braking a brake drum, comprising a pair of brake arms each constructed as an assembly of at least one sheet metal pressing, a base formed as an assembly of at least one sheet metal pressing, said arms each being pivotally coupled to said base, a brake block mounted on a brake shoe carried by each said arm, said brake blocks being arranged for engagement with opposite sides of the brake drum, said brake shoes being carried by said brake arms at intermediate locations thereon, a rod pivotally coupled with the end thereof which is coupled with said base, a fixed spring seat associated with the other of said brake arms and formed to provide a passage therethrough for receiving said rod, said rod extending through said passage, a floating spring seat at the end of said rod spaced from said fixed spring seat, a compression spring assembled between said fixed and floating spring seats and around said rod and serving to bias said brake arms about their pivots to urge the brake blocks towards one another for effecting braking of the drum, and a powered brake release mechanism arranged for exerting upon said rod a force to overcome the spring biassing of the arms and to pivot the arms apart, thereby to release the brake blocks from the drum.

4,020,927

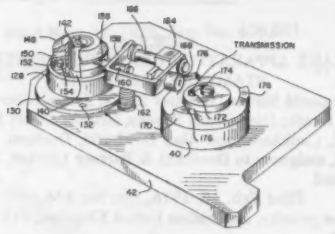
BRAKE MECHANISM FOR TURNSTILES AND THE LIKE

Terence J. Collins, Schaumberg, Ill., assignor to Qonaar Corporation, Elk Grove Village, Ill.

Filed Aug. 9, 1976, Ser. No. 712,775
Int. Cl.² F16D 59/00; E05D 7/086
U.S. Cl. 188—184 8 Claims

1. In a turnstile construction wherein arms are engaged by persons passing through the turnstile thereby moving a support for the arms, the improvement comprising a brake mechanism for limiting the speed of movement of the support, said brake mechanism including a brake drum, a pivotally mounted brake shoe means, a carrier for said brake shoe means rotatably mounted relative to said brake drum, rotation of said carrier imparting centrifugal force to said brake shoe means whereby the brake shoe means are adapted to engage said brake drum, said carrier being operatively connected to said support whereby movement of the support imparts rotary

movement to said carrier, means for retaining said brake shoe means in spaced relationship relative to said brake drum, and



means for releasing said retaining means after a predetermined degree of movement of said carrier.

4,020,928

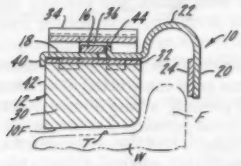
RAILROAD BRAKE SHOES WITH SEPARABLE INSERT ENGAGEABLE WITH FLANGE OF A WHEEL

Robert H. Beetle, Mountain Lakes, N.J., assignor to Abex Corporation, New York, N.Y.

Filed May 19, 1975, Ser. No. 578,615

Int. Cl.² F16D *65/04*

U.S. Cl. 188—237 **10 Claims**



9. A flange-guided brake shoe for a railroad vehicle adapted to be attached to a brake head member and comprising:

a body of friction material supported on a backing plate member which has toe guides at the ends thereof engageable by toes on the brake head;

an attaching lug member projecting from the backing plate member and adapted to fit between center pads on the brake head member, said pads together presenting a slot for a retainer key;

a separate guiding insert positionable between the brake head and the backing plate members, said insert including a support plate engageable complementally with a portion of the backing plate member;

a guide cantilevered on one side of said support and configured to fit the flange of a locomotive wheel thereby to guide the body of friction material into aligned contact with the tread of the wheel when the brake is engaged;

said attaching lug member having an opening therein to receive a key member passed through the slot presented by the brake head pads;

and said support plate presenting spaced opposed shoulders engageable with opposed surfaces presented by selected of said members to prevent both lateral and longitudinal displacement of the insert.

4,020,929

SHOCK ABSORBER

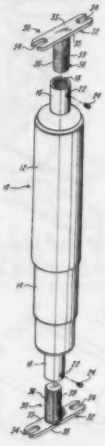
Gerald Goldin, 138 S. Parkview Ave., Columbus, Ohio 43209

Filed Oct. 28, 1975, Ser. No. 626,239

Int. Cl.² F16D *65/02*

U.S. Cl. 188—321 **17 Claims**

5. Shock absorber apparatus comprising a shell opposite ends of which are biased from each other to form a shock absorber body having a predetermined static length, adapter means including means for effecting a connection thereof to an underlying base structure or to an overlying structure to be supported by said body, means for linking said adapter means to an end of said shell, to form an extension thereof, said linking means comprising cooperating means one of which is centered in respect to an end of said shell and in connection therewith, and another of which is connected with said



adapter means, signal means on one of said cooperating means defining a series of distinguishable stations each of which provides a setting to which the other of said cooperating means may be referenced to achieve thereby a selected one of a plurality of possible set positions of said cooperating means which produces a predeterminable extension of said shell, and means utilizable to fix and maintain said cooperating means in the positions in which they are set.

4,020,930

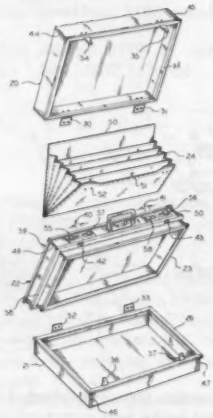
DOUBLE ACTION BRIEF CASE

Maurice J. Weber, Des Plaines, Ill., assignor to Trimco Mfg. & Engineering Inc., Chicago, Ill.

Filed Aug. 1, 1974, Ser. No. 493,766

Int. Cl.² A45C *3/02, 13/10*

U.S. Cl. 190—51 **5 Claims**



1. A double-action brief case comprising a central valence member, two oppositely disposed five-sided side shells hinged

together via said central valence member, the sixth and open side of each of the two side shells coming together on opposite sides of the valence, double-action locking means on the valence for alternatively securing said two side shells individually in closed positions adjacent the valence, and for releasing said side shells as desired,

said locking control means operable to release either of said side shells independently of the other and to release both said shells simultaneously with one manual operation;

first side shell latching means extending from said first side shell into said locking means and cooperating with said double action locking means to release one side shell from the valence when said locking means is operated, second side shell latching means extending from said second side shell into said locking means and cooperating with said double action locking means to release another side shell from the valence when said locking means is operated, and a deep tray closed compartment secured in the valence, the deep tray facing one side shell to form in cooperation therewith a closed compartment while completely blocking the other side shell from view,

said first and second side shell latching means comprising hasps, said hasps having a grooved shape enabling restraint and release by said double action locking means whereby said side shells are merged with said valence when said hasps are restrained and released from said valence when said hasps are released from said double action locking means, and

said locking means including four locks, two at each end of said valence, each of said side shells having said hasps on opposite ends, to cooperate with individually associated ones of said locks,

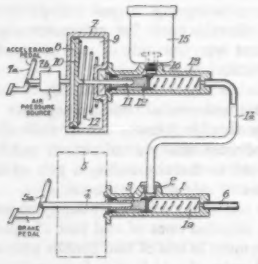
said two locks at each end of said valence having directionally opposing lock release means requiring reverse directional movement of each of said locks at each end of said valence respectively to simultaneously release both side shells.

4,020,931

ACCELERATOR HYDRAULIC CONTROL MEANS FOR FRICTION BRAKES

Jean-Claude Sertori, Eaubonne, France, assignor to Labavia-S.G.E., Paris, France

Filed Feb. 4, 1975, Ser. No. 546,926
Claims priority, application France, Feb. 8, 1974, 74.04347
Int. Cl.² B60K *21/00*
U.S. Cl. 192—3 TR **2 Claims**



1. A master-cylinder assembly for a vehicle braking system, comprising:

a. a brake pedal;

b. an accelerator pedal;

c. a main master cylinder means, operated by said brake pedal, to create a braking hydraulic pressure, said main master cylinder means having a first outlet orifice directly connected to the braking system and a piston means;

d. an additional master cylinder means, operated by said accelerator pedal on release of said accelerator pedal, to create a braking pressure which is smaller than the braking pressure created by said main master cylinder means, said additional master cylinder means having a second outlet orifice; and

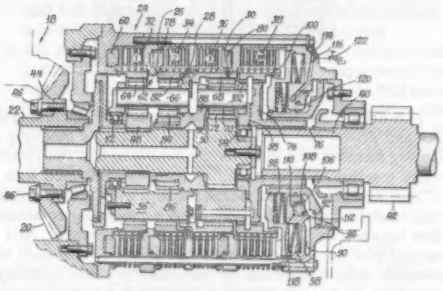
e. conduit means having one end connected to said second outlet orifice and another end connected to said main master cylinder means to communicate said second outlet orifice with said first outlet orifice, said conduit means at said another end connecting said second outlet orifice exclusively into said main master cylinder means at a position, adjacent said piston means, normally used for connecting a reservoir for working liquid into said main master cylinder means, wherein said another end is positioned with respect to said piston means such that when said main master cylinder means is not operated said second outlet orifice is in communication with said first outlet orifice and as soon as said main master cylinder means is operated said piston means blocks communication between said second outlet orifice and said first outlet orifice.

4,020,932

GEARED STEER TRANSMISSION

Willis E. Windish, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 515,158, Oct. 16, 1974, abandoned.
This application Jan. 19, 1976, Ser. No. 650,573
Int. Cl.² B60K *41/26*; F16D *65/24*; F16H *37/06*
U.S. Cl. 192—4 A **7 Claims**



1. In a transmission having a housing, input and output shafts having a plurality of planetary gear sets for providing a plurality of speeds, a parking brake for locking up said transmission including a first piston and spring means operably connected with said first piston for moving said first piston to engage said parking bake and lock up said transmission, and first means for disengaging said parking brake including first passage means for selectively communicating said first piston with a source of vehicle hydraulic pressure so that said first piston may be moved against the force of said spring means to disengage said parking brake, wherein said spring means operates to engage said parking brake when vehicle hydraulic pressure is lost, auxiliary means for disengaging said parking brake separate and distinct from said first means when said vehicle hydraulic pressure is lost comprising,

annular auxiliary chamber means,

a second annular piston disposed in said annular auxiliary chamber means and actuable to engage said first piston for moving said first piston against said spring means,

a port provided in said housing,

second passage means for communicating said port with said annular auxiliary chamber means,

coupling means disposed in said port for connecting the passage means with an external source of hydraulic pressure separate and distinct from said vehicle,

a check valve disposed in the passage means whereby said transmission may be disengaged when vehicle hydraulic pressure is lost by introduction of hydraulic fluid into said second passage means through said coupling means and check valve from a source of external hydraulic pressure, separate and distinct from said vehicle wherein said auxiliary means for disengaging said parking brake further comprises a selectively operable relief valve communicating with said second passage means for draining fluid from said second piston to selectively reapply said parking brake.

4,020,933

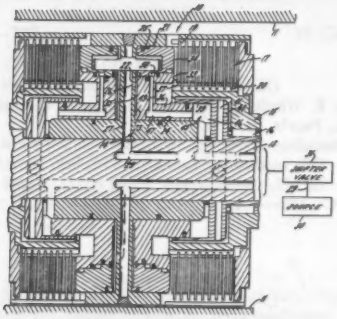
FLUID OPERATED CLUTCH WITH DUAL PISTONS

Raymond E. Gill, Clearwater, Fla., assignor to Westinghouse Air Brake Company, Pittsburgh, Pa.

Filed Aug. 28, 1975, Ser. No. 608,629

Int. Cl.² F16D *25/063*

U.S. Cl. 192—86 **4 Claims**



1. A fluid pressure actuated clutch assembly including driving and driven members, means for releasably coupling said driving member with said driven member so that two members move together, a fluid pressure chamber associated with one of said members, source means for supplying pressure fluid to said chamber, means for selectively establishing communication between said source means and said chamber, first and second pistons telescoped into said chamber and each being movable therein between an advanced position applying an actuating force to said releasable coupling means to couple said driving and driven members together and a retracted position releasing the coupling between said members, said first piston being movable within said chamber relative to said second piston, pressure means for acting on said pistons, said pressure means including a first return pressure chamber located between said first and second pistons, a second return pressure chamber associated with said second piston, and means for supplying fluid to said return chambers at substantially constant pressures regardless of the volume of such return chambers and thereby urging said pistons toward their retracted positions within said fluid pressure chamber, said pressure means urging said first piston toward its retracted position with a predetermined force less than the force with which said pressure means urges said second piston toward its retracted position, and means including a movable end wall of said chamber defined by said two pistons and preventing fluid from flowing out of said chamber as the latter is being filled regardless of the relative positions of said pistons with respect to each other and whereby the application of actuation forces to the coupling means by the pistons remains substantially the same under different conditions of in service use for the assembly so as to avoid clutch engagement shock regardless of changing characteristics of the pressure fluid due to different operating conditions.

4,020,934

FRICTION CLUTCH WITH YIELDABLE HYDRAULIC OPERATOR

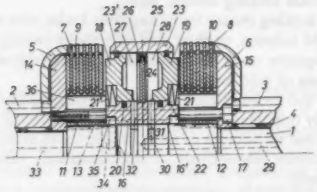
Johann Eichinger, Putzbrunn; Richard Strehler, Unterfoehring, and Gert Burzlauer, Anzing, all of Germany, assignors to Carl Hurth, Maschinen- und Zahnradfabrik, Munich, Germany

Filed Oct. 14, 1975, Ser. No. 621,674

Claims priority, application Germany, Oct. 31, 1974, 2451670

Int. Cl.² F16D *25/10*

U.S. Cl. 192—87.17 **7 Claims**



1. A hydraulically shiftable double actuator friction clutch, comprising:

a first rotatable membar having a pair of separate and spaced apart first friction members supported thereon for movement therewith and relative thereto;

a pair of spaced apart second rotatable members mounted for relative rotational movement and relative to said first rotatable member, each of said second rotatable members having secured thereto at least one second friction member supported for movement therewith and relative thereto, each of said second friction members being located to move into and out of engagement with one of said separate pair of said first friction members;

chamber means having a pair of pistons reciprocally mounted therein each for movement into and out of engagement with one side of said pairs of said first and second friction members;

abutment means adjacent the other side of each of said pairs of said first and second friction members;

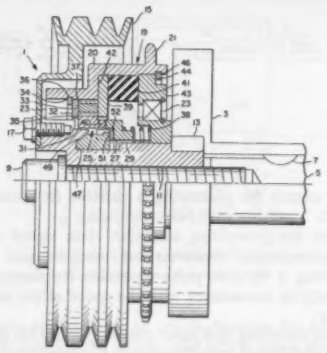
a resiliently flexible membrane in said chamber means located between said pair of pistons and free of connection thereto to thereby define a pair of chambers each having one of said pistons therein;

passageway means for selectively suppying pressurized fluid media to selected ones of said pair of chambers to effect an engagement of one of said pistons with said one side of each said pairs of said first and second friction members to clamp said friction members between said one piston and said abutment means, said resiliently flexible membrane flexing sufficiently upon the supply to a selected one said pair of chambers of pressurized fluid media whereby without slowing the entry of said fluid media the shock of the in-rushing fluid media is softened and undesired suddenness, or grab, in clutch engagement is minimized.

4,020,935
DIRECT CRANKING STARTER DRIVE

Harold Richard Mortensen, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed July 1, 1975, Ser. No. 592,137
Int. Cl.² F02N *15/00*; F16D *43/04*
U.S. Cl. 192—104 R 14 Claims



1. A starter drive adapted for use with an internal combustion engine and having a starting motor drivably connected thereto, comprising:

a driven member drivably connected to the engine crank shaft;

a driving unit drivably connected to the starting motor, said driving unit further comprising:

a cylindrical driving member coaxially disposed with said engine crank shaft; having a helical thread on a portion of the inside diameter;

a driving clutch element disposed within said cylindrical driving member internal diameter for rotation therewith, said driving clutch element having a helical spline on its external diameter and one-way dentyl sawtooth clutch teeth on one face portion; and

means for driving said driving clutch element interposed said cyclindrical driving member and said driving clutch element, said driving means including a ring member with a helical thread on the outside diameter, said helical thread adapted to communicate with the helical thread on the inside diameter of the cylindrical driving member, said ring member further having a helical thread on the inside diameter, said helical thread adapted to communicate with the helical thread on the outside diameter of the driving clutch element, whereby when a torque is applied to said cylindrical driving member the ring member is moved towards the driven member;

a clutch between the driving unit and the driven member; and

means for disengaging the clutch when the engine runs above a predetermined speed for disconnecting the driving unit from the driven member and for engaging the clutch when the engine runs below the predetermined speed for drivably connecting the driving unit to the driven member.

4,020,936
CENTRIFUGAL CLUTCH WITH CENTRIFUGAL DETENT

Richard C. St. John, North Canton, Ohio, assignor to Aspro, Incorporated, Fairfield, Conn.

Filed Oct. 29, 1975, Ser. No. 626,718
Int. Cl.² F16D *43/14*
U.S. Cl. 192—105 BA 21 Claims

1. Centrifugal clutch construction including

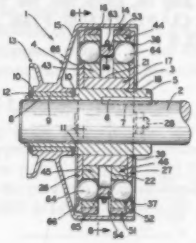
a. a driven clutch member;

b. drive shaft means having a pair of diametrically opposed surfaces;

c. a pair of spaced radially extending side plates mounted in a fixed position on the drive shaft means for rotation with said shaft means, with the drive shaft means surfaces being located between said side plates;

d. shoe means incuding two pairs of clutch shoes, mounting between the side plates and movable radially between retracted and extended positions, with each pair of clutch shoes being supported by a respective surface of the drive shaft means when the clutch shoes are in retracted position;

e. the clutch shoes having frictional coupling surfaces adapted to drivingly engage the driven clutch member when the shoes are in extended position;



f. release plate means mounted between each pair of clutch shoes and movable radially between extended and retracted positions;

g. ball means mounted between the side plate means and operatively engaged with each of the clutch shoes and the intervening release plate means when said clutch shoes and release plate means are in retracted positions, with said ball means restraining outward radial movement of said release plate means and clutch shoes; and

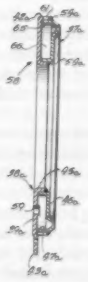
h. the release plate means being adapted to move radially outwardly under the influence of centrifugal force from retracted to extended position disengaging the ball means from restraining the clutch shoes when the drive shaft means reaches a predetermined speed, whereupon the clutch shoes snap outwardly from retracted to extended position and drivingly engage the driven

---

4,020,937
FABRICATED CLUTCH PRESSURE PLATE

Rudolph Richard Winter, Bloomfield Hills, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 10, 1975, Ser. No. 639,339
Int. Cl.² F16D *13/70*
U.S. Cl. 192—107 R 16 Claims



1. A fabricated clutch pressure plate comprising an annular front plate and an annular back plate stamped out of sheet

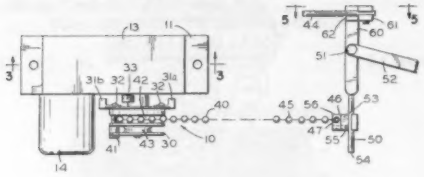
metal, each plate having a relatively flat annular base portion terminating an inner and outer peripheral flanges, the width of said back plate across the flanges being substantially equal to the interior width of the base of the front plate, said plates being assembled in nesting frictional engagement forming a central annular hollow chamber, and circumferentially spaced radially extending drive lugs mounted on said assembled pressure plate.

4,020,938

REMOTE CONTROL APPARATUS FOR VARYING ENGINE SPEEDS AND THE LIKE

Aimo J. Kytola, P.O. Box 752, Wilbur, Oreg. 97494

Filed July 16, 1975, Ser. No. 596,378
Int. Cl.² F16D *71/00*; F16K *31/04*
U.S. Cl. 192—142 R **4 Claims**



1. A remote control apparatus for varying engine speeds and the like comprising:

housing means;

reversible motor means mounted in operative relation to said housing means and including a first shaft driven at a constant rotational speed;

speed reducing means driven by said first shaft and including a second shaft rotatable at a substantially lower constant rotational speed than said first shaft;

pulley means mounted on said second shaft and rotatable therewith;

chain means attached at one end thereof to said pulley means, the other end of said chain means being attachable to a spring-biased throttle rod of an engine or the like,

said chain means being wound around said pulley means upon rotation of said motor means in one direction to pull said throttle rod and increase the speed of said engine, said chain means being unwound from said pulley means upon rotation of said motor means in the other direction to release said throttle rod and decrease the speed of said engine;

switch means mounted in communication with said motor means for stopping the same;

contact means disposed on said housing means for actuating said switch means; and

a pair of actuating members adjustably mounted on opposite sides of said pulley means so that said members can be rotated therewith, each of said members being movable into engagement with said contact means upon a predetermined rotation of said pulley means in either rotational direction,

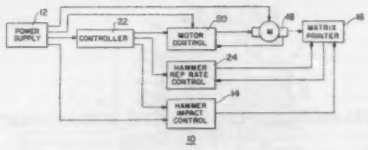
whereby rotation of said motor means in said one direction to rotate said pulley means and increase the speed of said engine causes a first one of said pair of actuating members to engage said contact means and stop said motor means upon reaching a predetermined maximum speed of said engine, and rotation of said motor means in said other direction to rotate said pulley means and decrease the speed of said engine causes a second one of said pair of actuating members to engage said contact means and stop said motor means upon reaching a predetermined minimum speed of said engine.

4,020,939

MATRIX PRINT HEAD REPETITION RATE CONTROL

Richard S. Quaif, Dryden, and John D. Hays, Ithaca, both of N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Oct. 21, 1975, Ser. No. 624,503
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **24 Claims**



1. A circuit for generating a variable frequency clock for use with a moving member comprising:

means for generating an input data signal representing alphanumeric character information, said data signal having a variable pulse-repetition frequency varying directly in accordance with the speed of the moving member;

means receiving said input data signal and for generating an output signal at a frequency corresponding to the frequencies of the received input data signal;

a reference oscillator having a pulsed output frequency greater than the pulse repetition frequency of said input data signal;

means for deriving a digital code from said reference oscillator indicative of said pulse repetition frequency in accordance with the output signal of said receiving means;

means for converting said digital code to an analog signal;

voltage controlled oscillator means having a control voltage derived from said analog signal coupled thereto and an output comprising said variable frequency clock; and

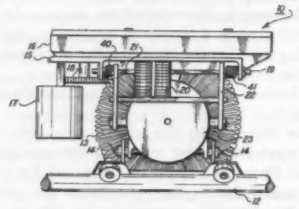
means for synchronizing said input data signal with said variable frequency clock.

4,020,940

RESILIENT COUPLING MEANS FOR RIBBON CARTRIDGE MOUNTING PLATE

Howard L. Daley, Dallas; Gerald S. Davidson, Plano, and Svetislav Mitrovich, Dallas, all of Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 18, 1975, Ser. No. 605,485
Int. Cl.² B41J *33/14*
U.S. Cl. 197—151 **2 Claims**



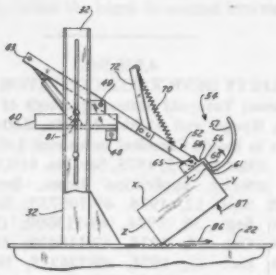
1. In a serial printer having a laterally movable carriage for traversing a printing line, print means supported on said carriage to print characters during a print time, ribbon cartridge support means and means for mounting said ribbon cartridge support means to said carriage, the improvement comprising:

said mounting means for said ribbon cartridge support means includes resilient coupling means operatively connected between the ribbon cartridge support means and remaining components of the carriage for reducing the position excursions of the carriage during print time, said resilient coupling means includes at least one spring having a spring rate between 4.0 lbs/in and 30.0 lbs/in.

4,020,941
ARTICLE INVERTER

Francis Millard Kennedy, Lynchburg, Va., assignor to Simplimatic Engineering Co., Lynchburg, Va.

Filed Oct. 28, 1975, Ser. No. 625,907
Int. Cl.² B65G 47/24
U.S. Cl. 198—402 16 Claims



1. Apparatus for inverting an article designed for use with a conveyor transporting the article, said article when thus transported having an initially leading portion and an initially trailing portion, comprising:

A. a support;

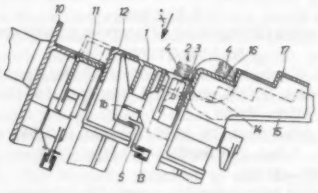
B. first means movably mounted on said support, said first means extending into the travel path of said article on the conveyor and when engaging said article being effective to restrict the forward motion of said leading portion relative to the forward motion of said trailing portion and cause said leading portion to rise relative to said trailing portion until said article is partially inverted to an over-center position; and

C. second means comprising a pressure-transmitting member fixedly mounted on said first means and a biasing member operatively connected to said support and said pressure-transmitting member, said biasing member being effective to cause said pressure-transmitting member to permit said over-center leading portion to descent, but to temporarily maintain engagement with said article as said leading portion descends and resist the rearward motion of said leading portion relative to the forward motion of said trailing portion, whereby said article is controllably deposited on the conveyor in a fully inverted position.

4,020,942
ENTRY CONVEYOR APPARATUS FOR COOLING BEDS

Otto K. Buchheit, Am Eulental 2, 667 St. Ingberg, Saar, Germany

Filed Mar. 21, 1975, Ser. No. 560,612
Claims priority, application Germany, Mar. 22, 1974, 2413845
Int. Cl.² B65G 57/03
U.S. Cl. 198—422 2 Claims



1. In a transverse conveyor for transferring flat stock articles from an entry rollerway to a cooling bed wherein the conveyor is defined by a declined transfer surface that includes a stationary guide having a first comb-like edge, a vertically displaceable bottom plate for accumulating a stack of the flat stock articles, and a laterally displaceable slide member disposed between the stationary guide and the bottom plate, which slide member is provided with a second comb-like edge for intermeshing engagement with the first comb-like edge, the improvement comprising:

a. a third comb-like edge on the slide member disposed parallel to and directed away from the second comb-like edge,

b. a fourth comb-like edge on the vertically displaceable bottom plate disposed parallel to and directed towards the third comb-like edge such that lateral displacement of the slide member causes the third and fourth comb-like edges to variably intermesh with each other in accordance with the width of the flat stock articles being transferred and thereby permit the bottom plate to accumulate and vertically displace a stack of the flat stock articles without requiring lateral displacement of the slide member towards the stationary guide,

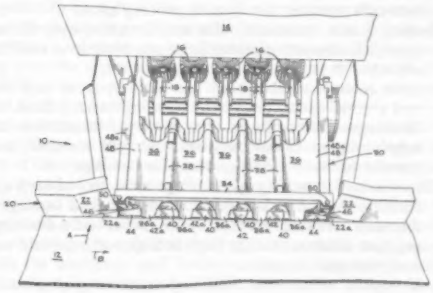
c. a plurality of double cranked levers actuated by a traction rod linkage disposed parallel to the longitudinal axis of the entry rollerway for laterally displacing the slide member, and

d. a plurality of vertically extending pivot pins carried by corresponding arms provided on the double cranked levers for supporting the slide member, wherein elongated holes are provided in the arms for permitting free play between the pins and their corresponding arms when the slide member is laterally displaced.

4,020,943
FRUIT FEEDING APPARATUS

Nyal B. Wood, Lake Hamilton, Fla., assignor to FMC Corporation, San Jose, Calif.

Filed June 17, 1976, Ser. No. 697,093
Int. Cl.² B65G 47/12
U.S. Cl. 198—445 10 Claims

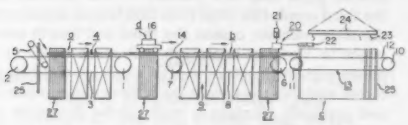


1. Fruit feeding apparatus for feeding singulated fruit of round shape in spaced parallel lanes at right angles from a bulk supply of loose fruit on a generally horizontally moving conveyor belt, said apparatus comprising a hopper positioned directly adjacent to one edge of said conveyor belt, said hopper having a plurality of spaced fruit feeding lanes extending at right angles from said belt and being defined by upwardly diverging walls, said walls terminating at their inner ends in end wall surfaces extending in upright relationship to the bottom of said lanes and being spaced outwardly from said edge of said belt, said hopper including a shallow fruit supporting inlet shelf extending generally in the plane of said conveyor belt from said belt to said end wall surfaces, said inlet shelf having a width measured at right angles to said belt between said belt and said end wall surfaces which is less than the diameter of a fruit but which is great enough so as to at least partially support a fruit thereon, whereby fruit on said belt will be caused to enter onto said inlet shelf of said hopper where a portion of each of said fruit will be subject to bumping by other fruit moving on said belt until entering into one of said fruit feeding lanes.

4,020,944
TRANSPORTING APPARATUS

Hiromitsu Kojima, Takehara, and Kimio Yoshida, Osaka, both of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo and Fuji Sangyo Co., Ltd., Osaka, both of, Japan

Division of Ser. No. 442,598, Feb. 14, 1974, Pat. No. 3,946,854. This application Jan. 26, 1976, Ser. No. 652,303
Int. Cl.² B65G 47/52
U.S. Cl. 198—473 **7 Claims**



1. An apparatus for transporting articles, such as electrode plates, comprising:

a first conveyor having a first conveyor member adapted to have said articles deposited thereon and transported thereby, said first conveyor member extending substantially horizontally and having a loading station and a discharge station associated therewith for respectively permitting articles to be loaded on and removed from said first conveyor member, and a first power device interconnected to said first conveyor member for drivably moving same;

a second conveyor having a second conveyor member adapted to have groups of said articles deposited thereon and transported therealong, each said group containing a preselected number of adjacent articles, said second conveyor member extending substantially horizontally and having supply and removal stations associated therewith for respectively permitting the articles to be deposited on and removed from said second conveyor member, and a second power device interconnected to said second conveyor member for drivably moving same;

feeding means associated with said first conveyor for sequentially depositing said articles one-by-one on said first conveyor member at said loading station;

transfer means movable back and forth between said first and second conveyors for transferring articles from the discharge station of said first conveyor member to the supply station of said second conveyor member, said transfer means including a movable carriage;

drive means for causing said carriage to be moved back and forth between a pickup position wherein said carriage is disposed over said first conveyor member and a discharge position wherein said carriage is disposed over said second conveyor member;

said transfer means also including article engaging means supported on said carriage for vertical movement relative thereto, and motor means coacting between said carriage and said article engaging means for controlling lifting and lowering of said article engaging means;

first control means for detecting the presence of a group of articles on said first conveyor member when said carriage is moving rearwardly from said second conveyor toward said first conveyor for stopping said carriage and energizing said article engaging means for lifting said group upwardly from said first conveyor member;

second control means coacting between said transfer means and said second conveyor when said carriage is being moved forwardly from said first conveyor toward said second conveyor for detecting the presence of a preselected space on said second conveyor member of a size capable of permitting said group to be deposited thereon, said second control means preventing lowering of said group onto said second conveyor member so long as said preselected space is not present; and

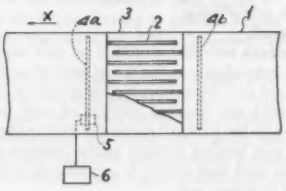
third control means for detecting the presence of the rearmost article on said second conveyor member and for stopping said carriage and energizing said motor means whereby said group is lowered into engagement with said second conveyor member, said third control means being operable only after said second control means has been activated so as to indicate the presence of said preselected space; and

fourth control means for activating said transfer means to return said carriage toward said first conveyor upon depositing of the group of articles on said second conveyor member.

4,020,945
SAFETY DEVICE FOR CONVEYOR BELT

Keigo Takeno; Yasuyuki Matsunaga, both of Kobe; Ryoichi Nomura, Hyogo, and Akihiro Nagata, Kobe, all of Japan, assignors to Bando Chemical Industries, Ltd., Kobe, Japan

Filed Sept. 5, 1975, Ser. No. 610,559
Claims priority, application Japan, Sept. 12, 1974, 49-105732; Sept. 12, 1974, 49-105733; Sept. 12, 1974, 49-105734; Sept. 30, 1974, 49-113090; Oct. 14, 1974, 49-118428; Oct. 14, 1974, 49-118429; Oct. 14, 1974, 49-118430; Oct. 31, 1974, 49-126215; Nov. 11, 1974, 49-130116; May 12, 1975, 50-56562; Aug. 4, 1975, 50-95238
Int. Cl.² B65G 43/00
U.S. Cl. 198—502 **7 Claims**



1. A safety device to detect elongation in a conveyor belt joint, said conveyor belt adapted to move at a substantially constant speed, said safety device comprising at least one first permanently magnetized area within said conveyor belt, at least one second permanently magnetized area within said conveyor belt and initially spaced a standard distance apart from said first at least one permanently magnetized area along the length of said conveyor belt, said first permanently magnetized area in the proximity of the forwardmost portion of said conveyor belt joint, said second permanently magnetized area in the proximity of the aftermost portion of said conveyor belt joint, at least one inductor adapted to respond to at least one said first permanently magnetized area and to at least one said second permanently magnetized area as said conveyor belt is moving past its, and means to measure the time lapse between said first permanently magnetized area response and said second permanently magnetized area response whereby the distance between said first and second permanently magnetized areas may be measured.

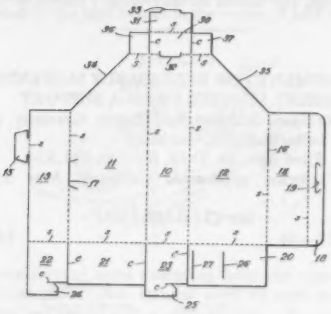
4,020,946
DISPLAY AND DISPENSING CARTON STRUCTURE AND BLANK THEREFOR

Marshall J. Gardner, 4040 Greenleaf Circle, Apt. 303, Kalamazoo, Mich. 49008, and Jeff A. Gardner, 10142 Graefield, Portage, Mich. 49081

Filed Sept. 29, 1975, Ser. No. 617,312
Int. Cl.² B65D 5/50, 1/34, 5/08
U.S. Cl. 206—45.16 **24 Claims**

1. A display and dispensing carton blank having an overlying top-forming panel, a first side-forming panel, a bottom-forming panel, a second side-forming panel, an underlying top-forming panel, and a flap-forming panel, all hingedly connected to each other in the order given along parallel fold lines, front end-forming panel means and back end-forming

panel means, and integral means for holding said panels together in assembled form, said top-forming panels being shorter than said bottom-forming panel, the front panel of said front-forming panel means being shorter than the width of said side-forming panels, and said side-forming panels sloping rearwardly to the front edge of said top-forming panels from a point spaced from the bottom-forming panel a distance equal to the height of the front panel of said front-forming panel means whereby, when the blank is erected into carton form,



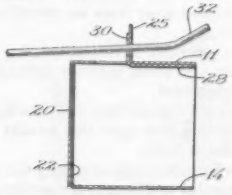
the front portion is cut away diagonally to form a display and dispensing opening, said integral means comprising fastening means for fastening said flap-forming panel to said first side-forming panel with the fold line between said flap-forming panel and said underlying top-forming panel being juxtaposed throughout its length with the fold line between said overlying top-forming panel and said first side-forming panel and securing means for securing the overlying top-forming panel in juxtaposition to the underlying top-forming panel.

4,020,947

CARTON SUSPENSION

Harry I. Roccaforte, Western Springs, Ill., assignor to Hoerner Waldorf Corporation, Saint Paul, Minn.

Filed Mar. 15, 1976, Ser. No. 666,956
Int. Cl.² B65D *5/06, 5/46*
U.S. Cl. 206—45.31 **2 Claims**



1. A carton suspension formed integrally with a paperboard blank adapted to be folded into a rectangular paperboard carton, said blank comprising four adjacent panels adapted to be folded to form top, bottom and side wall panels of the carton, panels connected to said rectangular panels and adapted to be folded as at least a back panel for said carton; said suspension comprising: p1 a die-cut section formed in said top panel and positioned within the border of said top panel, said section connected to said top panel along a first fold line extending parallel to said back panel of said carton;

a spacing flap hingedly attached to said top panel by a second fold line parallel to said first fold line and positioned along the exposed edge of said top panel opposite said back panel;

reinforcing means hingedly attached along a third hinge line to said flap, said reinforcing means being formed in shape substantially similar to said die-cut section, and said third fold line being spaced from second fold line a distance substantially equal to the spacing between said first and second fold lines; and

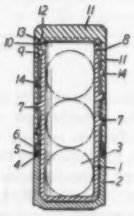
said die cut section and said reinforcing means having formed therein apertures which when folded together are of substantially similar shape and size.

4,020,948

TENNIS BALL STORAGE CONTAINER

Lee Chun Won, 11-567 Yunhee-dong, Sudaemun, Seoul, South Korea

Filed July 7, 1975, Ser. No. 593,694
Claims priority, application South Korea, Apr. 15, 1975, 752003
Int. Cl.² B65D *41/04, 53/02, 85/00*
U.S. Cl. 206—315 B **1 Claim**



1. A tennis ball storage container of the type wherein the balls located inside the container are maintained in an environment of compressed air, said container comprising a cylindrical storage means; a cylindrical lid arranged to be placed over said container to close same; two sealing means between said container and said lid arranged to effect and to maintain a generally air tight sealing engagement between the container and the lid during and upon the placing of said lid over the container, whereby air is substantially prevented from escaping from the space defined by the lid and by the container as the lid is being placed over the container to close same, the first sealing means being located near the top of said container and abutting said container and lid to maintain a seal as the lid is applied, and the second sealing means being located at the top of the container and abutting the lid when it is in complete engagement with the container, the volume of the inside of the cylindrical lid being generally equal to two thirds of that of the container, and wherein the base of the container is surrounded by a casing, the cylindrical lid is in threadable engagement with the container and further sealing means are provided between said casing and said lid to seal the lid against the casing.

4,020,949

BOTTLE INSPECTION DEVICE

Frank H. Erdman, Bradenton, Fla., assignor to Tropicana Products, Inc., Bradenton, Fla.

Filed Aug. 18, 1975, Ser. No. 605,466
Int. Cl.² B07C *5/344*
U.S. Cl. 209—73 **22 Claims**

1. Apparatus for high speed inspection of a portion of transparent bottles for imperfections comprising:

an inspection station having an inspection position;

imperfection sensing means positioned above the inspection position, operable to generate a reject signal when horizontal and vertical imperfections are detected, and operable for continuous rotation;

conveyor means operable to advance bottles toward the inspection station and to move inspected bottles toward a further processing station;

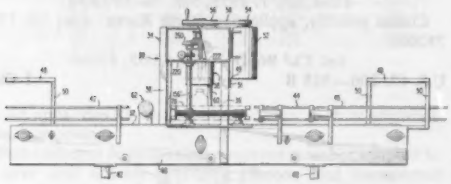
intermittent advancing means located at the inspection station, synchronously operable with the sensing means

and operable to receive bottles from the conveyor means and intermittently advance bottles one at a time to the inspection position below the sensing means;

ejection means positioned adjacent to the intermittent advancing means and operable to receive the reject signal and segregate an imperfect bottle fromm perfect bottles;

wherein the imperfection sensing means includes horizontal detection means for indicating the presence of generally horizontally oriented imperfections having

first light emitting means directed at a rim portion of a bottle in the inspection position,



first light collecting means for receiving light reflected upwardly by an imperfection; and

wherein the imperfection sensing means includes vertical detection means for indicating the presence of generally vertically oriented imperfections having

second light emitting means directed at a rim portion of a bottle in the inspection position, and

second light collecting means for receiving light reflected laterally by an imperfection.

4,020,950

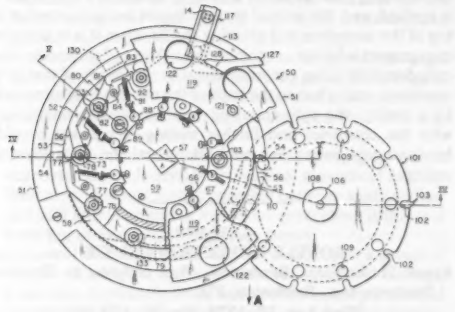
APPARATUS FOR INSPECTING AND SORTING BUTTONS

Charles H. Williams, Export, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Division of Ser. No. 444,498, Feb. 21, 1974, Pat. No. 3,956,636. This application Mar. 5, 1976, Ser. No. 664,403

Int. Cl.² B65G *59/06*

U.S. Cl. 209—73 **10 Claims**



1. A means for sorting buttons and the like comprising:

a circular base member; a sorter wheel rotatably mounted with respect to said base member and including a plurality of *n* button receiving slots about the periphery thereof; means for rotating said sorter wheel; an annular mounting support secured to said sorter wheel for rotation thereof; *n* index drive pin means positioned in alignment on said mounting support with an associated slot, each of said pin means including a drive pin adapted for movement into first and second positions, and means for positioning said drive pin; an indexing plate base member including an indexing plate rotatable with respect to said index base member and under a portion of said sorter wheel, said indexing plate including *n* drive openings around the periphery thereof adapted to receive a drive pin in a second position, and *n* button pass-through openings, each of said pass-through openings being associated and aligned with a drive opening, each of said pass-through openings having a center that lies on a circle that intersects a circle defined by the centers of said slots; a vacuum means having an opening through said circular base member having a center at the intersection of said circles defined by the centers of said slots and pass-through openings; and means for delivering a button to said slot.

4,020,951

ARRANGEMENT FOR RELEASABLY SUSPENDING A SHEET MEMBER FROM A SUPPORT

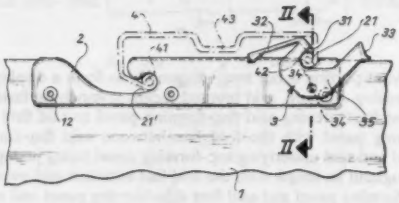
Roland Würthner, Stuttgart-Hedelfingen, Germany, assignor to Louis Leitz, Stuttgart, Germany

Filed Apr. 29, 1976, Ser. No. 681,554

Claims priority, application Germany, May 2, 1975, 2519549

Int. Cl.² B42F *15/04*

U.S. Cl. 211—46 **14 Claims**



1. In an arrangement for suspending a sheet member from a support, the sheet member having a substantially planar, elongated edge portion formed with two spaced notches for engagement by respective portions of said support, one of said notches being open transversely to the direction of elongation of said edge portion, the sheet member carrying a latching device for partly obstructing the open side of said one notch and for thereby retaining a portion of support in said one notch, the improvement in the latching device which comprises: a unitary latch body secured to said edge portion for movement toward and away from an operative position, said latch body including

1. two bracket portions having respective opposite faces and receiving said sheet member between said faces in movable engagement,
2. a detent portion connecting said bracket portions and partly obstructing said open side in said operative position of said latch body,
3. a spring portion abuttingly engaging the edge portion of said sheet member and biasing the latch body toward said operative position thereof.

4,020,952

ARTICULATED STAND APPARATUS FOR LAYING AND RECOVERING PIPELINE

Amborgio Scodino, San Donato Milanese, Italy, assignor to Saipem S.p.A., Milan, Italy

Filed Mar. 27, 1975, Ser. No. 562,799

Claims priority, application Italy, Mar. 28, 1974, 49833/74

Int. Cl.² B66C *23/42*

U.S. Cl. 214—1 PA **2 Claims**

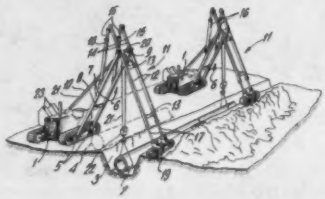
1. An improved articulated stand apparatus for laying or recovering a pipeline in or from a trench dug in the ground, said apparatus being hinged on the side of a tracked means or sideboom and having a lifting tackle provided with a hook, comprising:

a first rigid frame having two parallel arms hinged at their

lower ends to a side of the tracked means in such a way that said frame can be rotated in a plane transversal to the tracked means by a positioning cable fixed to the upper part of said first frame and winding around to a drum of a capstan of the tracked means,

a second rigid frame having parallel hollow tubular arms with extensible telescopic elements on their lower ends for resting on the ground and with their upper ends hinged to said first rigid frame,

said two rigid frames being disposed according to a reversed V with the lifting tackle provided with the hook supported by the said frames in the vertex of said reversed V,



two cantilevered arms extending from the upper parts of said parallel hollow tubular arms of said second rigid frame and

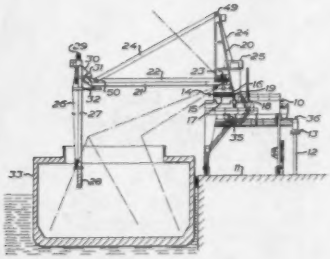
two hydraulic cylinders having their lower ends hinged to the center line of said arms of said first rigid frame and including at their upper ends pistons hinged at their upper ends to said cantilevered arms for hydraulically rotating said second rigid frame about said first rigid frame for moving said second rigid frame over a trench and laying its extensible elements on the ground of the trench opposite the tracked means.

4,020,953

APPARATUS FOR UNLOADING PARTICULATE MATERIAL, ESPECIALLY FROM SHIPS

Karl Vilhelm Evert Eklof, and Karl August Lennart Tingskog, both of Helsingborg, Sweden, assignors to AB Siwertell, Bjuv, Sweden

Filed Mar. 31, 1976, Ser. No. 672,491
Claims priority, application Sweden, Apr. 7, 1975, 7503924
Int. Cl.² B65G *67/58*
U.S. Cl. 214—14 **6 Claims**



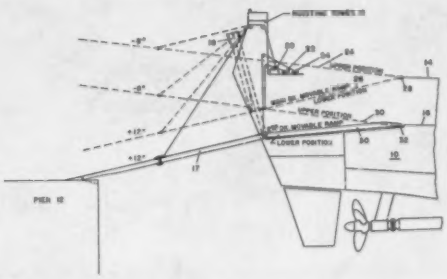
1. Apparatus for unloading particulate material, especially from ships, comprising supporting means (10, 16), a vertical conveyor section (27), a horizontal conveyor section (22), said vertical and horizontal conveyor sections (22, 27), forming an arm system, means (14) for swingably mounting this arm system on said supporting means (10, 16), means (31, 32) interconnecting said vertical and horizontal conveyor sections (22, 27) in a torsionally rigid but pivotal manner for mutual relative movements in a common plane, means (37) for pivotally mounting said horizontal conveyor section (22) on said supporting means (10, 16), and means (38-40, 45) for mounting said horizontal conveyor section (22) on said supporting means (10, 16) in a tiltable way for inclination of the plane common to said vertical and horizontal conveyor sections (22, 27) relative to a vertical plane.

4,020,954

SHIP LOADING RAMP

Radoje Vulovic, Swarthmore, Pa., assignor to Sun Shipbuilding and Dry Dock Company, Chester, Pa.

Filed Jan. 5, 1976, Ser. No. 646,696
Int. Cl.² B65G *11/00*
U.S. Cl. 214—15 R **3 Claims**



1. A system designed to couple a ship to a pier for loading-/unloading while allowing for substantial changes in the height of the ship relative to the pier caused by changes in tide and draft, comprising:

a. a ship having at least first and second decks with each of said first and second decks having an internal movable loading ramp and with the internal movable loading ramp of the first deck being located vertically above the internal movable loading ramp of the second deck, each internal loading ramp having a ship end toward the ship and a pier end toward the pier and means for pivotably mounting each internal loading ramp to the deck at its ship end to enable the pier end of the ramp to move angularly up and down relative to the ship end of the ramp;

b. said ship having a folding combination door-ramp means, said combination means being used as a door on the ship when it is folded and being utilized as a ramp extending from the ship to a pier when it is unfolded;

c. means for detachably coupling said combination means for use as a ramp to the pier end of the internal movable loading ramp of either of said two decks, whereby the coupling of the combination door-ramp means to the internal movable loading ramp of either of said two decks allows the ship to be coupled to the pier for loading/unloading despite substantial changes in tide and draft.

4,020,955

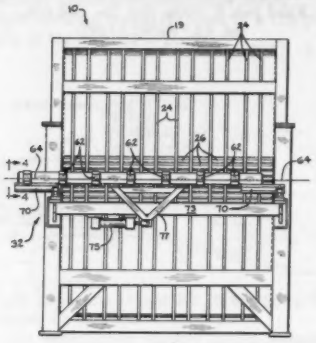
PART STORAGE APPARATUS

Michael J. Schroeder, Fenton, Mich., assignor to LaSalle Machine Tool, Inc., Warren, Mich.

Filed Aug. 18, 1975, Ser. No. 605,258
Int. Cl.² B65G *47/00*
U.S. Cl. 214—16.4 R **6 Claims**

1. Apparatus for storing parts comprising a frame, a cylindrical structure having a longitudinal axis, said structure being mounted on said frame for rotation in opposite directions about said longitudinal axis, a plurality of spaced-apart support shelves on said structure, each of said shelves extending substantially radially with respect to the axis of said structure, said support shelves forming a plurality of part storage compartments, each of said storage compartments being formed from a pair of adjacent support shelves and extending longitudinally of said cylindrical structure for storage of a plurality of parts therein, each of said compartments being open on the radially outer side thereof, a drive mechanism mounted on

said frame and engaged with said cylindrical structure for intermittently rotating the structure in response to the operation of said drive mechanism, retaining means extending substantially circumferentially of said cylindrical structure and located radially outwardly of said compartments for retaining parts in said compartments during rotation of said structure, and a part indexing unit mounted on said frame and disposed in substantially horizontal alignment with one of said compartments for moving parts therein and longitudinally thereof, said indexing unit comprising a plurality of spaced-apart retractable rods movable from positions radially outwardly of said one compartment to positions extending into said one compartment through said radially outer side thereof, said rods being movable longitudinally of said compartment for advancing parts therein and being retractable out of said one compartment to positions in a clearance relation with said cylindrical structure during rotation thereof.

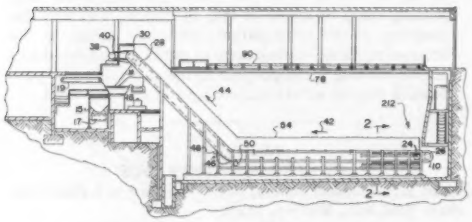


4,020,956

LIVE BOTTOM PIT FOR A SOLID WASTE DISPOSAL SYSTEM

Herman Van Hille, 130 Sharene Lane, Apt. 10, Walnut Creek, Calif. 94596

Filed July 18, 1975, Ser. No. 592,490
Int. Cl.² B65G *65/44*
U.S. Cl. 214—17 DA **22 Claims**



1. In a solid waste disposal system, a pit for the collection of solid waste to be incinerated, said pit comprising:

a pair of opposed walls and a bottom therebetween;

a plurality of endless means positioned between said opposed walls, a first portion of said plurality of endless means being positioned in a substantially horizontal position near at least a portion of the bottom of said pit for forming a live or moving bottom for the pit and a second portion of said plurality of endless means extending inclined upwardly at an angle in excess of 35° and out of said pit; and

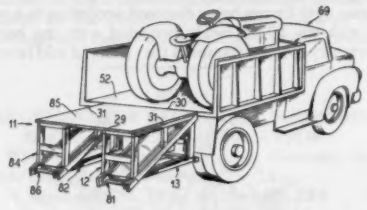
means for driving said endless means to remove a layer of solid waste adjacent said endless means from the bottom of a mass of solid waste in the pit.

4,020,957

DETACHABLE TRUCK BED EXTENSION AND LOADING RAMP

Eugene Wilson Wren, Rte. 2, Morris, Ill. 60450

Filed Aug. 8, 1975, Ser. No. 603,005
Int. Cl.² B65G *67/02*
U.S. Cl. 214—38 R **6 Claims**



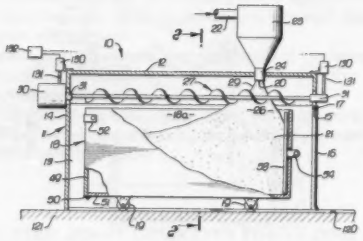
1. A detachable truck bed extension and loading ramp useful with a truck having a bed, comprising a lower portion, a hinge means connecting said lower portion to an upper portion, a mounting means for connecting said upper portion to the rear of said truck such that a top end portion of said upper portion is flush with said truck bed, carrying means for transporting said loading ramp and truck bed extension into position for mounting, a base plate effective as a truck bed extension resting upon said lower sections in a transportation position, said lower portion comprising first and second right triangular shaped lower sections and said upper portion comprising first and second right triangular shaped upper sections, and said mounting means comprising lower weight bearing grooves for receiving groove pipes and upper nut supports with mounting nuts attached thereon for receiving mounting bolts.

4,020,958

BULK MATERIAL CONTAINER LOADING AND SYSTEM

Robert R. Wheeler, 7615 Shady Oak Drive, Downey, Calif. 90240

Continuation of Ser. No. 312,596, Dec. 6, 1972, abandoned. This application Dec. 6, 1974, Ser. No. 530,195
Int. Cl.² B65G *67/10*
U.S. Cl. 214—41 R **5 Claims**



1. In a bulk material handling system, the combination comprising

a. an upwardly open container and a housing forming a zone removably receiving the container to be moved into position in the housing to be filled with said material and thereafter to be removed from the housing for transport, the container supported on wheels,

b. material supply means defining an outlet for gravity flow of the material to fill a localized portion of the container, and there being a generally horizontal materials conveyor everywhere directly and openly overlying said zone and

being everywhere located openly above the container but closely spaced to the top level thereof to spread the material filling said container portion up to the level of the conveyor so that the spread material will fill other portions of the container, said outlet openly exposed downwardly through the conveyor to said zone therebeneath, the conveyor comprising a screw conveyor having an elongated generally horizontal shaft,

c. a drive connected with the conveyor shaft to rotate same, and

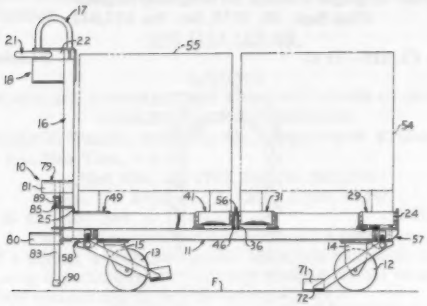
d. elevator means supporting the conveyor at opposite ends thereof and outside the container to elevate and lower the conveyor and its drive relative to the container and the housing, said elevator means being free of connection to and support by the container and connected to the conveyor at locations in alignment with the direction of travel of the container on said wheels.

4,020,959

CART CONSTRUCTION

Richard E. Livesay, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 14, 1975, Ser. No. 595,824
Int. Cl.² B60P 1/52; B60T 1/14
U.S. Cl. 214—84 **18 Claims**



7. In a cart having a wheeled base, and roller means defining a support surface for removably carrying a transport container, the improvement comprising: retaining means on said cart for selectively retaining said cart against wheeled movement on said support surface; means for locking said roller means to prevent movement of the container thereon during wheeled movement of the cart; and selectively operable means for (a) releasing said roller means to permit movement of the container thereon, and concurrently operating said retaining means for (b) locking the cart against wheeled movement as an incident of releasing said roller means.

4,020,960

SLAG POT TRANSFER TRAILER

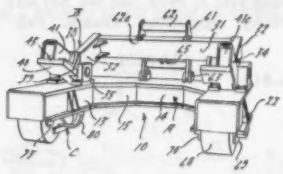
Charles R. Louis, Trenton, and Lawrence J. Ulanski, Holly, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed June 7, 1976, Ser. No. 693,405
Int. Cl.² B60P 3/00
U.S. Cl. 214—390 **4 Claims**

1. An apparatus for conveying large volume ladles of the type useful in heavy metallurgical industries, the apparatus comprising:

a. a frame having a U-shaped configuration disposed in a generally horizontal plane, said U-shaped configuration defining a yoke effective to fit about the ladle to be conveyed, said yoke having legs straddling opposite sides of said ladle and effective to engage trunnions on said ladle for lifting same, the spacing between said legs being slightly greater but close to the diameter of said ladle,

b. a lift assembly having cranks pivotally supported on each of said legs of said yoke and extending along said opposite sides of said ladle, each crank having angled arms defining an included angle of about 120°, the lever arms of said



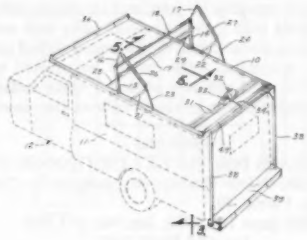
crank being proportioned to provide maximum lifting with the arms maintained below the silhouette of said ladle in a lifted position.

4,020,961

OBJECT LOADING AND UNLOADING APPARATUS

Archie E. Musgrove, 710 E. 20th St., Newton, Iowa 50208

Filed Oct. 22, 1975, Ser. No. 624,962
Int. Cl.² B60P 3/10
U.S. Cl. 214—450 **9 Claims**



1. Apparatus for loading or unloading an object to or from an elevated surface comprising:

a frame adapted to be attached to an elevated surface;

a first member pivotally attached to said frame along a first pivotal axis;

a second member pivotally attached to said frame along said first pivotal axis;

a third member connected to said first and second members for supporting a portion of said object;

a fourth member attached to said frame at one end thereof;

biasing means attached to the other end of said fourth member at one end thereof and to one of said first, second and third members at the other end thereof, for biasing said first member towards said fourth member and thereby biasing said third member upwardly;

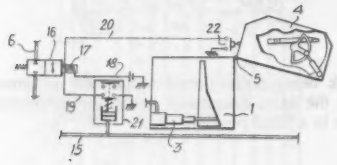
means connected to said frame for preventing said first member from pivoting past a predetermined point towards said fourth member; and

winch means connected to said frame for connection to said object for selectively pulling the object upwardly onto said third member in one operative direction of the winch means or for slowly allowing gravity to lower the object in a second operative direction of said winch means.

4,020,962
EJECTION BOTTOM CONTROL DEVICE FOR REFUSE COLLECTION BODY

Marcel Colin, Marsilly, France, assignor to Societe d'Equipements, Manutentions et Transports (S.E.M.A.T.), Paris, France

Filed Feb. 4, 1975, Ser. No. 547,024
Claims priority, application France, Feb. 18, 1974, 74.05404
Int. Cl.² B60P 1/00
U.S. Cl. 214—518 3 Claims

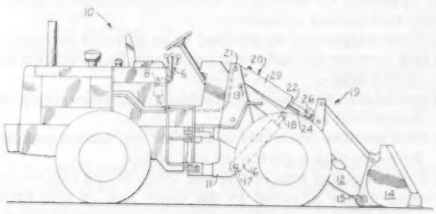


1. In a refuse collection vehicle comprising a body having a rigid forward wall, a movable bottom being slideably mounted adjacent the front end of said body, a hydraulic cylinder-and-piston actuator operatively connected to said movable bottom for ejecting the collection materials and retaining said materials when the piston of said actuator is retracted, said body further comprising at its rear end a door hinged about a transverse upper axis and provided with hydraulic means for ramming the collected materials into said body, a device for controlling said moveable ejector bottom through said actuator so as to maintain a predetermined compression of the loaded materials rammed by said ramming means incorporated in said hinged door, said device comprising an automatic valve controlling the contraction of said actuator and therefore the recession of said movable bottom, and an elastic bellows-like device associated with said automatic valve and interposed between said actuator and said rigid forward wall of said body, whereby said automatic valve cannot be opened until the force exerted by said actuator attains a value sufficient for adequately compressing said elastic bellows-like device.

4,020,963
LINKAGE MEANS FOR BUCKET POSITIONER SYSTEM

Carl W. Carter, Peoria County, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 18, 1976, Ser. No. 697,504
Int. Cl.² E02F 3/85
U.S. Cl. 214—762 13 Claims



1. Linkage means operatively coupled with first and second members pivotally mounted relative to each other about a pivot axis, for selectively transmitting a mechanical signal across said pivot axis comprising;

a first link pivotally mounted to the first member to be pivotable to first and second positions relative thereto, and defining a circular cam surface;

a second link pivotally mounted to said second member to be pivotable to first and second positions relative thereto, and defining a coacting surface which said circular cam surface contacts with the first link in said first position thereof, to define a first position of the second link;

means for moving the second link to a second position responsive to movement of the first link to its second position;

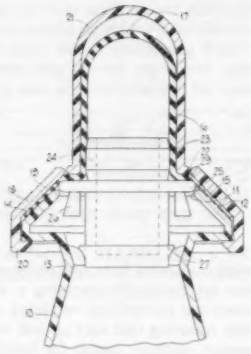
mechanical signal originating means operatively coupled to said first link to selectively move said first link to respective first and second positions;

mechanical signal receiving means operatively coupled to said second link to be moved upon movement of said second link to said first and second positions thereof responsive to movement of said first link to said respective first and second positions thereof; and wherein the centerpoint of the circular cam surface lies substantially along the pivot axis of the first and second members with the first link in said first position and with the circular cam surface in contact with said coacting surface of the second link, so that during pivoting of the first member relative to the second member with the first link in said first position, the second link remains stationary relative to the second member.

4,020,964
INFANTS FEEDING BOTTLE

Eric Kenneth Hurst, London, England, assignor to Lewis Woolf Griptight Limited, Birmingham, England

Filed Sept. 10, 1975, Ser. No. 612,042
Int. Cl.² A61J 9/00
U.S. Cl. 215—11 C 2 Claims



1. An infants feeding bottle comprising a container for liquid, a teat securable onto the container, a detachable teat cap enclosing the teat before use, and a closure member frictionally engageable within the teat before use, and arranged to be dislodged by manipulation of the teat cap into the interior of the container, with the cap covering the teat, the container, teat, teat cap and closure member being of substantially oval sections respectively, the longer dimensions of the oval sections being aligned, and the teat having an outlet slit at its end, the length of the slit being in the direction of the longer dimensions of the oval sections.

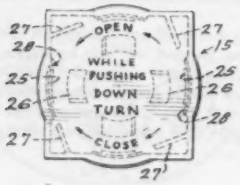
4,020,965
CHILD RESISTANT CLOSURE

John D. Northup, 2460 Underhill Road, Toledo, Ohio 43615

Filed May 3, 1976, Ser. No. 682,775
Int. Cl.² B65D 55/02, 55/56; A61J 1/00
U.S. Cl. 215—213 3 Claims

1. In a child resistant closure for a container having a threaded finish portion, said closure comprising a round inner cap member having threads engageable with the threads on said container to draw said inner cap member into sealing engagement with the top of said container finish and to release

the same, an outer cap member, cooperating means on said inner and outer cap member engageable only upon an axial displacement of said outer cap member to drive said inner cap member in a releasing direction, said outer cap member having a polygonal configuration of six sides or less to define a peripheral series of spaced, hollow protuberances to facilitate gripping by the user, leaf spring driving members housed



within the spaces formed by said protuberances between said inner and outer cap members, and ratchet teeth formed on the periphery of said round inner cap member to engage said leaf spring driving members when said outer cap member is turned in a clockwise direction to tighten said inner cap member on said container, said driving members passing over said ratchet teeth when said outer cap member is turned in a clockwise direction.

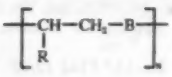
4,020,966

PLASTISOL COMPOSITION AND CONTAINER CLOSURE GASKET MADE THEREFROM

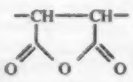
Walter R. Wszolek, Sykesville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,018
Int. Cl.² B65D *41/10*; C08L *23/00*, *91/00*
U.S. Cl. 215—349 **9 Claims**

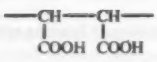
1. A plastisol composition comprising (a) a copolymer resin of a normal α-olefin and maleic anhydride (1:1 mole ratio) having a particle size in the range from about 0.1 to about 1500 microns and having the structure



wherein B is a member of the group consisting of

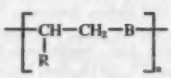


and

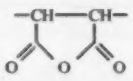


R is II or C_xH_{2x+1}, x is 1 to 16 and n is 2–300, and (b) 65–600 parts/100 parts copolymer of a polyepoxide plasticizer.

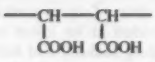
4. A container closure comprising a cap having deposited therein a resinous mass functioning as a gasket to seal the container when the closure is in sealing relationship with the container, said resinous mass comprising a fluxed plastisol of a composition comprising (a) a copolymer resin of a normal α-olefin and maleic anhydride (1:1mole ratio) having a particle size in the range from about 0.1 to about 1500 microns and having the structure.



wherein B is a member of the group consisting of



and



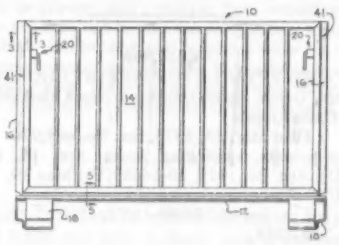
R is H or C_xH_{2x+1}, x is 1 to 16 and n is 2–300, and (b) 65–600 parts/100 parts copolymer of a polyepoxide plasticizer.

4,020,967

COLLAPSIBLE CONTAINER

Ronald D. Hammond, and Dwight E. Nichols, both of Beatrice, Nebr., assignors to Hoover Ball and Bearing Company, Saline, Mich.

Filed Sept. 15, 1975, Ser. No. 613,082
Int. Cl.² B65D *7/24*, *7/00*; B65J *1/02*; B65D *21/00*
U.S. Cl. 220—6 **5 Claims**

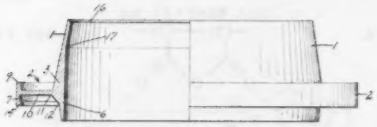


1. A collapsible container comprising a floor and side end walls, each of said walls having at the lower edge thereof an irregularly shaped projection having a downwardly extending leg portion and an outwardly and upwardly curved portion at the lower end of said leg portion, said floor having at the outer edge thereof means forming a groove shaped complementary to the shape of said projection, said groove forming means comprising an upwardly extending flange and an arcuate bottom surface at the lower end of said flange extending outwardly and upwardly in a path substantially parallel to said curved portions of said wall projections, said arcuate surface terminating in a lip which overhangs said curved portions of said wall projections so that said wall projections are in interfitting relationship with said groove forming means to thereby form a pivotal connection between said walls and said floor limiting movement of said walls relative to said floor to up and down pivotal movement in all moved positions of said walls in which said lip overhangs said curved portions, each of said walls being pivotally movable outwardly and downwardly to a position in which the projection on the lower end thereof is out from under said lip thereby enabling removal of said wall from a pivotally connected relationship with said floor groove forming means.

4,020,968
CONTAINER RIM GUARD AND EXTENSION DEVICE

Victor Chiavola, 15 Hill Drive, Bohemia, N.Y. 11716; George Chiavola, 697 Heckscher Ave., Bayshore, N.Y. 11706, and John Scott, 50 South Ave., Smithtown, N.Y. 11787

Filed Sept. 17, 1975, Ser. No. 614,075
Int. Cl.² B65D *25/20, 47/40*
U.S. Cl. 220—90 4 Claims



1. A rim guard and extension device adapted to be removably secured to the rims of open containers, comprising a tubular member provided at its lower end with an integral annular flange extending radially and horizontally outwardly, wherein the upper edge of the wall of said tubular member tapers inwardly, and a downwardly-extending vertical internal member contiguous with said tubular member for insertion into said container and engagement with the inner edge of said rim, said vertical internal member being tapered downwardly and outwardly at an obtuse angle from said annular flange in order to securely engage the inner edge of various rims of slightly different sizes and shapes, and said annular flange being provided at its outer edge with a circumferentially continuous downwardly-extending vertical external member for engagement with the outer edge of said rim, said annular flange being additionally provided at its outer edge with a circumferentially continuous upstanding flange which is contiguous with said vertical external member and forms an annular catch basin.

4,020,969
LID OF A RECEPTACLE FOR INSTANT COOKING FOOD

Koki Ando, Osaka, Japan, assignor to Nissin Shokuhin Kaisha, Ltd., Osaka, Japan

Filed Mar. 24, 1976, Ser. No. 669,974
Claims priority, application Japan, Apr. 18, 1975, 50-53567[U]; Apr. 24, 1975, 50-56681[U]; May 19, 1975, 50-67406[U]
Int. Cl.² B65D *41/02, 41/32*
U.S. Cl. 220—265 12 Claims

1. A lid for covering an opening in a receptacle containing items therein, said lid comprising:

a lower layer removable and hermetically sealed over said opening in said receptacle and having at least one portion thereof extending beyond the edge of said receptacle, whereby said lower layer can be lifted away from said opening in said receptacle by grabbing said portion thereof extending beyond the edge of said receptacle;

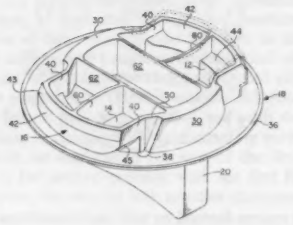
an upper layer attached to and covering said lower layer; and

one of said layers having at least one opening therethrough, said opening being small enough to prohibit the items within said receptacle from passing therethrough.

4,020,970
ROTATABLE CLOSURE DEVICE

Richard A. Koscik, Richton Park, and George M. Rapata, Park Ridge, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 24, 1975, Ser. No. 644,013
Int. Cl.² B65D *41/06*
U.S. Cl. 220—293 15 Claims

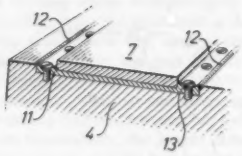


1. A one-piece plastic cap for use with an apertured panel having at least one slot communicating with said aperture, said cap including a body rotatably accepted within said aperture, a head portion having rotation inducing means, circumferentially continuous resilient sealing means extending laterally from adjacent one end of said body and having a diametral extent greater than said slotted aperture, at least one flexible retainer pad acceptable within said at least one slot and extending laterally from said body in predetermined spaced relation to said sealing means, and capable of resilient flexure to accommodate said panel between said at least one pad and said sealing means when said cap is rotated to cause said pad to underlie said panel, and transversely disposed resilient means for controlling the flexure in said pads.

4,020,971
METHOD OF AND ARRANGEMENT FOR SEALING THE JOINTS BETWEEN THE PARTS OF A MULTI-PART HOUSING

John David Bertil Östbo, Byvagen 84-86, S-151 52 Sodertalje, Sweden

Filed Apr. 18, 1975, Ser. No. 569,438
Claims priority, application Sweden, Apr. 19, 1974, 7405332
Int. Cl.² F16J *15/08*
U.S. Cl. 220—378 10 Claims



1. In the known multi-part housing which is characterized by:

a first housing,

a second housing,

said first and second housing being made of the same metallic material,

a first portion of said first housing and a second portion of said second housing being disposed in essentially parallel relationship with each other,

a first strip of a second metallic material connected to said first portion of said first housing and a second strip of the same second metallic material being connected to said second portion of said second housing,

said second metallic material having erosion properties that

are superior to those of the metallic material that makes up said first and second housings,

said first and second strips of said second metallic material being pressed into sealing-tight contact with each other, the improvement which comprises

said first and second strips of said second metallic material each being supported by and joined to separate rail members that each consist of a strip of material having the same metallic composition as said first and second housings,

one of said rail members being fixed in a groove formed in said first portion of said first housing, and

the other of said rail members being fixed in a groove formed in said second portion of said second housing,

each of said rail members being wider than the strip of said second metallic material which each of said rail members supports.

4,020,972

BANKNOTE DISPENSING MACHINE

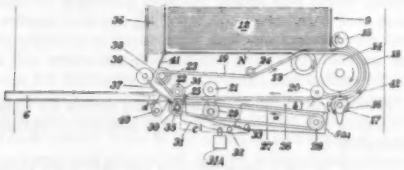
Leif Lundblad, Huddinge, Sweden, assignor to Inter Innovation A.B., Stockholm, Sweden

Filed Aug. 21, 1975, Ser. No. 606,356

Claims priority, application Sweden, Aug. 29, 1974, 7410941

Int. Cl.² B65H *3/04, 29/58*

U.S. Cl. 221—13 **10 Claims**



1. A machine for dispensing bundles of banknotes comprising means for supporting a stack of banknotes; a banknote removing means for removing banknotes sequentially from said stack; a first conveyor means for conveying removed banknotes in serial spaced relationship along a first flow-path; detector means for detecting the simultaneous passage of plural banknotes along said first flow-path; a collecting compartment for collecting banknotes in the form of a bundle, said collecting compartment being inaccessible to a user of the machine, said collecting compartment at least in part being formed by said first conveyor means and including stop means normally disposed to inhibit movement of the banknotes by said first conveyor means beyond said collecting compartment but retractable to permit further movement of a bundle of banknotes by said first conveyor means, a second flow-path for receiving a bundle of banknotes from said collecting compartment, said second flow-path terminating in a delivery aperture accessible to said user; and divertor means under the control of said detector means for diverting from said second flow-path a bundle of banknotes which includes banknotes detected as plural banknotes by said detector means, said collecting compartment being further formed by additional conveyor means, disposed in spaced relationship to said first conveyor means, and the space between the additional conveyor means and said first conveyor means accommodating a bundle of banknotes.

4,020,973

APPARATUS FOR REMOVING ROD-SHAPED ARTICLES FROM A MAGAZINE

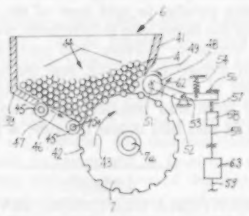
Werner Hinz, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Feb. 5, 1976, Ser. No. 655,548

Claims priority, application Germany, Feb. 13, 1975, 2505998

Int. Cl.² B65H *43/00*

U.S. Cl. 221—13 **10 Claims**



1. Apparatus for removing rod-shaped articles which constitute or form part of smokers' products from a magazine which contains a supply of parallel rod-shaped articles, which has an outlet for evacuation of articles and which includes two walls flanking said outlet, comprising a conveyor including a portion adjacent said outlet and a plurality of parallel article-receiving means; means for driving said conveyor so that successive receiving means travel along said outlet in a direction toward and beyond one of said walls, thereupon toward and beyond the other of said walls and receive articles during travel between said walls; a refuser adjacent said outlet intermediate said conveyor and said other wall, said refuser being positioned to prevent said conveyor from removing articles which are not received in said receiving means whereby the articles which tend to leave said magazine while not received in a receiving means of said conveyor exert a force against said refuser; and means for arresting said driving means in response to exertion of a predetermined force against said refuser.

4,020,974

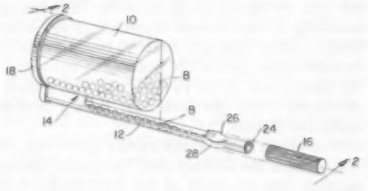
BB SHOT CONTAINER AND DISPENSING FILLER

Martin G. Bauer, and Betty A. Bauer, both of Rte. No. 1, Box No. 15, Bismarck, N. Dak. 58501

Filed Jan. 15, 1976, Ser. No. 649,188

Int. Cl.² F41C *25/00*; A47F *1/00*

U.S. Cl. 221—307 **5 Claims**



1. A container for BB shot having a dispensing filler for filling an air rifle, comprising:

a. a container portion having internal dimensions which are large compared with the diameter of a BB and having an outer wall;

b. a filler tube portion located offset from and adjacent to said outer wall, the tube portion having an inner bore diameter slightly larger than the diameter of a BB and of

length much greater than said diameter whereby a number of BBs can be aligned in the bore for delivery to said rifle; and

c. a transfer portion having side walls joining the tube portion with the container portion at its outer wall, the transfer portion having a transfer slot between opposed side walls, the slot joining the bore of the tube portion with the inside of the container, the slot being about as wide as the diameter of the bore of the tube portion and of length measured along said bore greater than twice the diameter of a BB but smaller than the length of the tube portion;

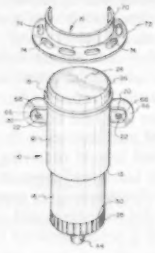
d. the container portion being cylindrical and having an axis extending parallel to said bore of the tube portion, the tube portion being long as compared with the axial length of the container portion, said portions being made of resilient transparent plastic, and the tube portion being distorted at a location near its discharge end which is remote from said transfer portion to prevent the discharge of said BBs unless the tube is manually straightened.

4,020,975

WALL-MOUNTABLE DISPENSING DEVICE FOR BULK AND ENCAPSULATED MATERIALS

R. Thomas Stauffer, 813 E. Vine St., Apt. 202, Murray, Utah 84107

Filed Aug. 21, 1975, Ser. No. 606,614
Int. Cl.² B65D *35/56*
U.S. Cl. 222—93 6 Claims



1. A wall-mountable dispenser for encapsulated semiliquid materials comprising:

a cylindrical housing having an open end and a closed end, the internal wall of the housing being threaded;

means for removably mounting the housing on a vertical surface with the housing in a generally vertical orientation having the open end of the housing downward;

a raised ridge circumscribing the housing adjacent the closed end;

a removable fixture for placement on the housing in abutment with the raised ridge comprising (a) a semicylindrical wall having an inside diameter dimensionally corresponding to the outside diameter of the housing and a height greater than the distance between the raised ridge and the closed end of the housing so as to form a basin at the closed end of the housing and (b) a shelf extending outwardly from the wall and having article-receiving apertures therein;

a coaxial piston fixed to the closed end of the housing and spaced from the housing wall, the piston having side walls parallel with the walls of the housing and extending an incremental distance from the open end of the housing;

a cup configurated to telescopically cooperate between the housing and the piston, the cup having thread engaging means for engaging the threaded wall of the housing, the cup having a polygonal spout receiving hole in the bottom of the cup;

a cylindrical capsule for semiliquid materials and having a spout at one end and a cap for the spout, the spout having a polygonal base dimensionally corresponding to the polygonal hole, the capsule being dimensionally configurated to be received in the cup with the spout extending through the hole in the cup and the polygonal base preventing rotation of the capsule in the cup when the cap for the capsule spout is removed and replaced; and

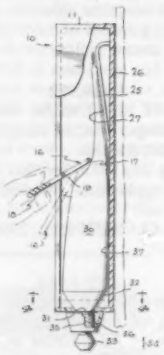
means for moving the cup relative to the piston to squeeze the capsule between the cup and the piston to force the semiliquid materials through the spout, said means comprising a hand gripping portion around the base of the cup to accommodate hand rotation of the cup to cause a corresponding axial movement of the cup into the housing.

4,020,976

TOOTHPASTE HOLDER AND DISPENSER COMBINATION

Joseph S. Mineo, 22119 Runnymeade, Canoga Park, Calif. 91303

Filed June 5, 1975, Ser. No. 584,107
Int. Cl.² B65D *35/28*
U.S. Cl. 222—103 4 Claims



1. A toothpaste holder and dispensing device for squeezing the contents of a pliable tube through a nozzle comprising the combination of:

a housing having a back member and side walls projecting forward of said back member in fixed spaced apart relationship terminating along their edges in connection with a front wall;

a pressure plate carried on said back member and provided with a downwardly and rearwardly sloping surface wherein an angular chamber is defined between the opposing surfaces of said front wall and said pressure plate;

an actuator slidably carried on said frontwall having a finger grasping portion and a tube engaging portion;

said actuator further having a guide means cooperating with said front wall for retaining said actuator in sliding relationship therewith which includes a pair of parallel slots provided in said front wall defining a central strip therebetween and said actuator further including a pair of side members joining said finger grasping portion to said tube engaging portion wherein said side members are slidably disposed and carried through said pair of slots respectively;

said guide means further includes an intermediate portion interconnecting said pair of side members midway between said fingers grasping portion ans said tube engaging portion;

said intermediate separating and defining a pair of openings wherein said central strip passes through said opening between said intermediate portion and said finger engaging portion;

said angular chamber is occupied by said tube and said

actuator is manually operable towards and away from said tube to controllably depress and collapse said tube against said sloping surface of said pressure plate;

said housing includes a removable bottom having an open ended slot for receiving and supporting the base of said tube so as to stand in an inverted position; and

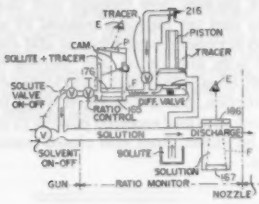
a threaded member detachably engageable with said tube nozzle and further a skirt carried on said threaded member bearing against the underside of said bottom for holding said tube in said inverted position.

4,020,977

CONTINUOUS FLOW RATIO MONITOR

Valentine Hechler, IV, 26 Meadow View Road, Northfield, Ill. 60093

Division of Ser. No. 482,353, June 24, 1974, Pat. No. 3,938,550. This application Jan. 26, 1976, Ser. No. 652,378
Int. Cl.² G01N *1/20*
U.S. Cl. 222—145 5 Claims



1. In combination with a device dispensing a solution under pressure, a housing defining a compartment having a chamber for a tracer dye,

piston means mounted in sealed relationship in said chamber separating it into at least one collapsible compartment;

means for supplying pressure against said piston means to collapse said compartment and including a flow passage supplied by at least one of said solution elements having a flow restriction downstream from said chamber, and

means for delivering tracer dye from said collapsible compartment to a conduit conducting solute at a pressure less than said supply pressure and including a passage having a flow control valve at the outlet of said collapsible compartment and connected to said solute conducting conduit.

4,020,978

MANUALLY-OPERATED DISPENSER

Harry Szczepanski, 900 Clancy NE., Grand Rapids, Mich. 49505

Filed Aug. 15, 1975, Ser. No. 605,185
Int. Cl.² B65D *37/00*
U.S. Cl. 222—209 4 Claims

1. A dispenser for discharging a liquid in an atomized spray, comprising:

a housing formed of a material capable of substantial resilient deformation under manually applied forces, said housing being elongated and having a first opening at one end thereof and a second opening adapted to be sealingly covered by a finger of the user;

a container formed of a readily deformable material for holding said liquid, said container being elongated, having an opening at one end thereof, and receivable within said housing with said opening of said container being in close proximity to said first opening of said housing, and with said container extending the length of said housing; and

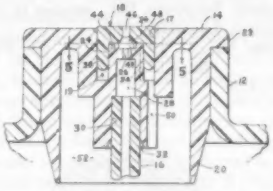
a cap member having a first neck portion receivable within said first opening of said housing and adapted to have fluidtight connection with said housing and a second neck portion receivable within said opening of said container and adapted to have fluid-tight connection with said container, said cap member having a first port extending through said cap member and communicating with the interior of said container and at least one second port communicating with the portion of the interior of said housing external of said container, said second port terminating at a point closely adjacent the outer end of said first port whereby air discharged through said second port upon manual deformation of said housing atomizes the liquid discharged through said first port.

4,020,979

SQUEEZE-BOTTLE-TYPE SPRAY DISPENSER

Joseph John Shay, Manchester, and Donald Russell Falkowski, Derry, both of N.H., assignors to Summit Packaging Systems, Inc., Londonderry, N.H.

Filed Oct. 15, 1975, Ser. No. 622,537
Int. Cl.² B05B *11/04*
U.S. Cl. 222—211 13 Claims



1. For a squeeze bottle a closure having a discharge orifice for discharging a fine spray mist, the closure having means to sealingly engage the bottle mouth, the closure having a swirl chamber formed therein coaxial and just behind the orifice and having its center communicating with the orifice, a dip tube adapted to have its lower end extend into the bottle immersed in liquid, its upper end securely engaging the closure, the upper end of the dip tube being operatively connected into the swirl chamber at a first locus, and passage means in the closure extending from the inside of the bottle above the liquid level to conduct air into the swirl chamber at a second locus, at least one of said loci being located at the periphery of the chamber and the entry of the associated fluid thereto being effected channel means terminating at the said locus and directing the associated fluid circumferentially into the chamber in a tangential direction in an unobstructed path, whereby a fluid swirl is created to discharge highly atomized liquid form the orifice.

4,020,980

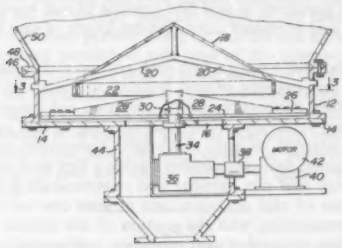
VOLUMETRIC FEEDER

Charles P. Illes, Jr., Chattanooga, Tenn., assignor to Flow Star Industries Inc., Chattanooga, Tenn.

Filed Mar. 3, 1976, Ser. No. 663,321
Int. Cl.² G01F *11/20*
U.S. Cl. 222—411 12 Claims

1. Apparatus comprising a vessel for storing flowable solids, a feeder for feeding said solids from said vessel said feeder

being connected to said vessel and having a discharge port, said feeder having at least one feeder blade for feeding solids from within the housing to said discharge port, said feeder supporting said blade for rotation in one direction about the axis of said port, a cone supported above said blade, said blade having a curved tip portion attached to an outer end and extending outwardly beyond the periphery of said cone, an upright fin secured to said blade and extending from a location



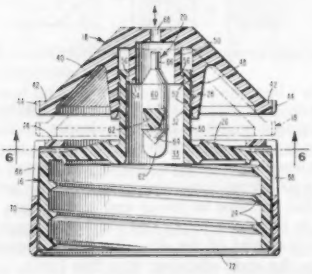
adjacent the tip portion of the blade to a location adjacent said discharge port, the height of the fin being greater than the thickness of said tip portion, the outermost end of said fin being substantially coextensive with the innermost end of said tip portion to form a continuous surface for moving solids inwardly to said port as said blade rotates, said blade being a flat horizontally disposed blade with the fin upright along the one side edge of the blade which is the leading edge in the direction of rotation of the blade.

4,020,981

SAFETY CLOSURE DEVICE

Frank S. Nixdorff, Baltimore, Md., assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Nov. 11, 1975, Ser. No. 630,940
Int. Cl.² B67D *3/00*
U.S. Cl. 222—525 **17 Claims**



1. A safety closure device for containers comprising:

a base member disposed about a central axis and comprising an annular base surface facing in a first direction having a peripheral edge spaced a first distance from said central axis, at least one radially inwardly recessed portion in said peripheral edge spaced from said central axis a second distance less than said first distance, and a neck upstanding from said base surface in said first direction and having a dispensing bore terminating at its outer end in a bore opening,

a valve member positioned in said dispensing bore for selectively controlling dispensing from said safety closure device,

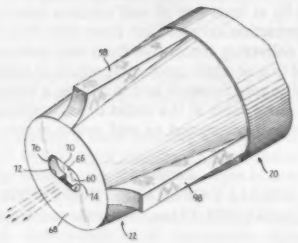
a closure cap mounted on said neck and being rotatably and axially movable with respect thereto, said closure cap having a substantially smooth outer surface that is difficult to grasp for axial movement of said closure cap, said closure cap comprising a dispensing opening registerable with said bore opening and radially extending manually operable tab means selectively radially alignable with said recessed portion and having a tab surface in opposed relationship to said base surface, said tab means extending radially outwardly a third distance greater than said second distance and substantially not greater than said first distance, said closure cap being movable rotatably about said central axis with respect to said base member between a safe position wherein said tab means is not aligned with said recessed portion and an operating position wherein at least a portion of said tab means is aligned with said recessed portion, said closure cap also being axially movable with respect to said base member by manually engaging said tab means between a closed position wherein said tab surface is adjacent to said base surface and said valve member blocks flow through said dispensing opening and an open position wherein said tab surface is spaced from said base surface and said valve member permits flow through said dispensing opening whereby said tab means is masked by said base surface and said peripheral edge when in said closed position not aligned with said recess and thereby cannot easily be manually engaged to move said closure cap axially in said first direction, but is unmasked when in at least partial alignment with said recessed portion to allow said closure cap to be moved from said closed position to said open position.

4,020,982

ROTARY SHUT-OFF NOZZLE

Lewis A. Micallef, Fort Lee, N.J., assignor to Leeds and Micallef, Fort Lee, N.J.

Filed Oct. 10, 1975, Ser. No. 621,491
Int. Cl.² B05B *1/12*
U.S. Cl. 222—554 **9 Claims**



1. A multiple purpose nozzle comprising:

a tubular member having an exposed edge, a passageway therethrough and through which material to be dispensed is adapted to pass;

an adjustable cap having an end wall with an orifice of predetermined configuration therein associated with the tubular member and adjacent and touching the exposed edge thereof and adapted to assume a first position at which it seals the passageway from the orifice to prevent the material from being dispensed;

the cap adapted to assume at least one other position at which the material to be dispensed is adapted to pass in a selected predetermined discharge pattern through the passageway and orifice, the exposed edge remaining exposed to atmosphere at all of the positions;

coupling means for associating the cap with the tubular member whereby the cap may be shifted between the first and other position; and

means on the cap and tubular member for limiting the exposure of the amount of material to be dispensed to atmosphere when the cap is adjusted to seal the passage-

way thereby preventing drying of a significant amount of material to be dispensed in the nozzle when the nozzle is not in use, the exposure limiting means including a passage network defined by surfaces of the tubular member and cap that communicates with the orifice of the cap when the cap is in the other position and, when the cap is adjusted to the first position to seal the passageway from the orifice, only the orifice in the cap and exposed edge of the tubular member are exposed to atmosphere thereby preventing drying out of the material to be dispensed when the nozzle is not in use, the passage network including at least one longitudinally extending channel terminating at the exposed edge of the tubular member adjacent the orifice in the cap, channel means adapted to communicate the passageway and the channel with one another, the surfaces forming the channel and channel means being formed by cooperating surfaces on the tubular member and interior surfaces of the cap, rotation of the cap from the first position to the other position aligns the channel with the orifice to permit communication between the passage network and the orifice and flow of material to be dispensed therethrough from the passageway of the tubular member and rotation of the cap to the first position interrupts the passage network and blocks the flow of material from the passageway to the orifice through the passage network.

4,020,983

APPARATUS FOR JOINING A BUCKLE TO A TAPE

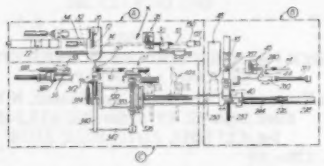
John R. Asel, Lorraine; Roger Allaire, St. Leonard; Peter Thalmann, Lachine, and Rene Castonguay, Montreal, all of Canada, assignors to Canadian Lady-Canadelle Inc., W. Montreal, Canada

Filed Apr. 22, 1976, Ser. No. 679,423

Claims priority, application United Kingdom, May 14, 1975, 20441/75

Int. Cl.² A41H *43/00*

U.S. Cl. 223—49 **10 Claims**



1. Apparatus for securing a two-slot buckle onto a tape including means for supplying horizontally disposed buckles to a delivery point, a pivotable buckle holding and transfer device arranged to receive said delivery point and pivotable through about a right angle to move the buckles from the delivery point to a threading position adjacent the operative part of a joining machine, in which threading position the buckles are disposed vertically, threading means for holding and advancing a free end of tape past the operative part of the joining machine and through one slot in the vertically held buckle, bending means for bending the said free end of the tape towards the other slot in the buckle, and blade means for pushing the free end of the tape through the other slot in the buckle and into a position adjacent the main part of the tape extending from the buckle, so that said adjacent parts of the tape are positioned in the operative part of the joining machine to allow said free end to be joined to the main part of the tape by said machine.

4,020,984

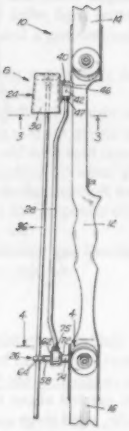
SNAP-ON BOW-MOUNTED QUIVER

George W. Morris, 11889 Kilgore, Sunnymead, Calif. 92388

Filed Aug. 1, 1975, Ser. No. 601,336

Int. Cl. F41c *33/00*

U.S. Cl. 224—1 B **1 Claim**



1. A quick-detachable, snap-on quiver and mounting assembly on an archery bow having a central handle section, said quiver and mounting assembly comprising, in combination:

a pair of spaced-apart mounting brackets adapted to be mounted on the handle section of a bow, each of said mounting brackets consisting of an angle member having a first flange adapted to be fixed to the handle section and a second flange projecting laterally from one side of a bow, said second flanges of said pair of angle members being parallel to one another and adapted to be in planes perpendiculr to the longitudinal axis of a bow;

upper and lower end members connected together by an intermediate member;

one of said end members being provided with means to receive and shield the pointed ends of a plurality of arrows;

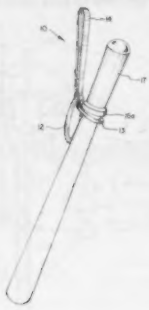
the other of said end members having spring clips that yieldingly engage and releasably hold the shafts of the arrows near the feathered ends thereof;

attachment brackets on said upper and lower end members cooperating with said mounting brackets, each of said attachment brackets having a pair of opposed parallel surfaces that are spaced apart to receive between them the said second flange of the corresponding mounting bracket; and

each of said attachment brackets having a spring-loaded detent ball protruding from one of said surfaces that seats in a socket formed in said second flange of the mounting bracket, so as to provide a yielding connection between them resisting relative movement of the attachment bracket relative to its correspondiing mounting bracket, said spring-loaded detent ball being yieldable under a predetermined separating force to allow the quiver to break away from a bow;

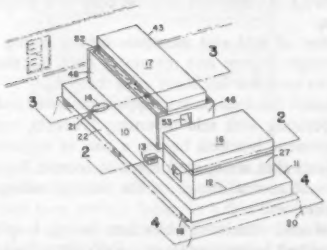
said end members being snapped onto their respective mounting brackets by pressing them together with sufficient pressure to overcome said spring-loaded detent balls.

4,020,985
EQUIPMENT HOLDER
Kenneth Lowder Halterman, 2232 Vimont Ave., Salt Lake City, Utah 84109
Filed Aug. 9, 1974, Ser. No. 496,062
Int. Cl.² A45F *3/00*
U.S. Cl. 224—5 R **2 Claims**



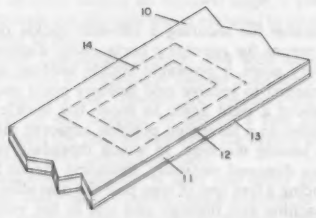
1. An equipment holder comprising
a strap having a first end turned back to form a loop in one end thereof for supporting the holder in suspended relation from a belt carried about the body of a person:
a pair of concentric, rigid rings carried by the other end of said strap, said rings each having a portion engaging said strap; and
a substantially, non-metallic spacer carried by said strap and separating the rings, whereby the outer of said concentric rings is between and restrained by the terminal edge of the first end and the said spacer, the inner ring of the concentric rings is secured between the substantially rigid spacer and a loop formed in the strap by the second end of the strap.

4,020,986
CONSOLE CADDY
James L. McAtee, 4053 Wynn Road, Bellingham, Wash. 98225
Filed May 2, 1975, Ser. No. 573,923
Int. Cl.² B60R *7/04*
U.S. Cl. 224—42.42 R **1 Claim**



1. A portable storage assembly for holding accessories in a vehicle comprising:
a planar pallet having a plurality of recesses extending inwardly from its top surface;
a plurality of attach means joined to the bottom surface of said planar pallet whereby said pallet may be removably attached to said vehicle;
a first box assembly removably engaged in one said recess, wherein said first box assembly comprises:
a lower compartment having a bottom, two sides, two ends and an inwardly extending recess in each said end forming a hand hold whereby said box assembly may be lifted and carried;
an internal shelf removably suspended inside said lower compartment on an outwardly extending flange, said shelf extending downwardly to a point less than the full depth of said lower compartment to form a space wherein ice may be placed, said internal shelf having a plurality of recesses in its top surface wherein receptacles may be removably engaged, said internal shelf having a plurality of apertures therethrough whereby cold air from said ice may pass up around said receptacle; and
a top cover having a top surface, two sides and two ends resting on said outwardly extending flange of said internal shelf: and
a second box assembly removably engaged in one other said recess, wherein said second box assembly comprises:
a lower compartment having a bottom, two sides, two ends and an inwardly extending recess in each said end forming a hand hold whereby said box assembly may be lifted and carried, said bottom and said ends extend outward of said sides to hold a side container in removable engagement;
an internal shelf removably suspended inside said lower compartment on an outwardly extending flange, said shelf extending downwardly to a point less than the full depth of said lower compartment to form a space wherein ice may be placed, said internal shelf having a plurality of recesses in its top surface wherein receptacles may be removably engaged, said internal shelf having a plurality of apertures therethrough whereby cold air from said ice may pass up around said receptacles; and
a top cover having a top surface, two sides and two ends resting on said outwardly extending flange of said internal shelf, and wherein said side container comprises:
a bottom; and
two upwardly extending sides whereby when said container is engaged by said ends of said lower compartment with said container sides abutting said sides of said lower compartment a storage space is formed.

4,020,987
SOLDER PREFORM FOR USE IN HERMETICALLY SEALING A CONTAINER
Norman Hascoe, 791 Weaver St., Larchmont, N.Y. 10538
Filed Sept. 22, 1975, Ser. No. 615,545
Int. Cl.² H01L *23/10;* **B23K** *35/26*
U.S. Cl. 228—56 **3 Claims**

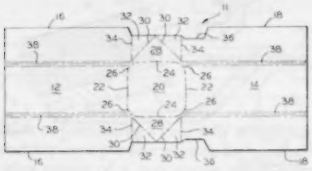


1. A solder preform for hermetically sealing a cover to a container for a semiconductor package comprising a relatively thick flat ring of an alloy consisting of 90–97% lead, 1–4% tin, and 1–4% silver and having the characteristic that it solidifies from the fluid state as a homogeneous mixture and a relatively thin coating clad on each surface thereof of an oxidation-resistant alloy consisting of 92–98% tin and 2–8% silver.

4,020,988
CARTON WITH CONTOURED, RECESSED BOTTOM WALL

Michael A. Kipp, Phoenixville, Pa., assignor to Container Corporation of America, Chicago, Ill.

Filed June 10, 1976, Ser. No. 694,650
Int. Cl.² B65D 5/24, 3/00
U.S. Cl. 229—16 A 7 Claims



1. A tubular carton formed from a cut and scored blank of paperboard, or the like, and having a contoured, recessed bottom wall, said carton comprising:

a. a side wall formed from a pair of generally rectangular side wall panels having their edges secured in an overlapped relationship:

b. a bottom wall foldably secured at opposite side edges to bottom edges of said side wall panels along fold lines;

c. a first gusset panel foldably secured to said bottom wall along a fold line substantially normal to said fold lines between said bottom wall and said side wall panels;

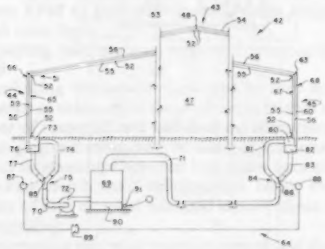
d. a pair of second gusset panels each foldably secured along diverging fold lines to said first gusset panel and to a respective one of said side wall panels;

e. the distance between said fold lines securing said second gusset panels to said side wall panels being less than the maximum width of said bottom wall.

4,020,989
LIGHT TRANSMITTING BUILDING PANEL

Glenn E. Kautz, Sewickley, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed Oct. 20, 1975, Ser. No. 624,275
Int. Cl.² F24J 3/02
U.S. Cl. 237—1 A 7 Claims



1. In a greenhouse having a structural framework, opposite side walls and opposite end walls erected on said framework, and a roof structure spanning between said opposite side walls and supported on said framework; the combination including:

said roof structure comprising a plurality of edge overlapped panels spanning between said opposite side walls and each comprising,

a flat central sheet having a first face and opposite thereto a second face,

lower and upper corrugated sheets confronting, respectively, said first face and said second face of said flat central sheet and each being secured to said flat central sheet along contiguous portions thereof, said lower and upper corrugated sheets cooperating with said flat sheet to provide, respectively, a set of inner cells presented interiorly of said greenhouse and a set of outer cells presented exteriorly of said greenhouse,

the upper corrugated sheet being laterally offset relatively to the lower corrugated sheet such that each outer cell is presented intermediate of adjacent inner cells, and

said flat central sheet and lower upper corrugated sheets each being formed from light transmitting glass fiber reinforced plastic; and a gas recirculating system comprising:

a heat reservoir having a reservoir inlet conduit and a reservoir outlet conduit;

outlet duct means exending between and communicating with the cells of one said set at one end of the panels of said roof structure and with said reservoir inlet conduit;

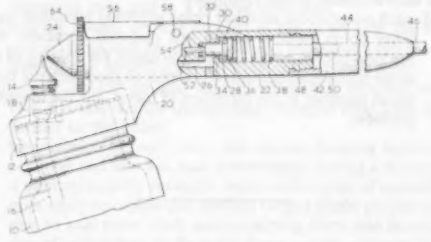
inlet duct means extending between and communicating with said reservoir outlet conduit and with the cells of said one said set at the opposite end of the panels of said roof structure; and

fan means for recirculating gas through said system and the cells of said one said set.

4,020,990
SPRAY GUN

Stanley Herbert Luff, Hull, England, assignor to Humbrol Limited, Hull, England

Filed Jan. 19, 1976, Ser. No. 649,934
Claims priority, application United Kingdom, May 6, 1975, 18861/75
Int. Cl.² B05B 7/08
U.S. Cl. 239—346 7 Claims

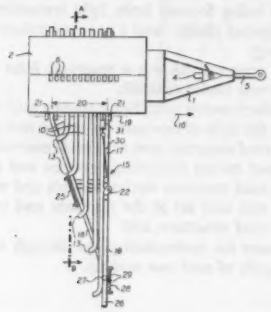


1. A spray gun comprising a reservoir means for containing liquid, a spray head, a spray jet carried by the spray head, a tube depending from the spray jet into the reservoir means for feeding the spray jet, an air jet positioned adjacent the spray jet, means for conducting pressure air from a source to the air jet to cause a stream of air to flow past the spray jet whereby a negative pressure induced in the latter draws liquid from the reservoir means and into the air stream, a valve housing through which passes the means for conducting pressure air, a manually operable air valve arranged in the housing and comprising a valve seat and a valve closure member movable towards and away from the seat, lever means mounted externally of the housing and arranged to cooperate with the valve closure member to move said member away from the valve seat, and a manually adjustable stop comprising a rotatable camming arranged to limit movement of said lever means so as to limit displacement of said valve away from said seat.

4,020,991
MACHINE FOR THE PNEUMATIC SPREADING OF GRANULAR MATERIAL

Heinz Dreyer, Hasbergen-Gaste, Germany, assignor to Amazonen-Werke H. Dreyer, Hasbergen-Gaste, Germany

Filed Mar. 10, 1976, Ser. No. 665,669
Int. Cl.² A01C 15/04; B05B 1/20
U.S. Cl. 239—655 23 Claims



1. In a machine suitable for broadcasting of granular material while traveling over an area in which the material is to be distributed, comprising

a. a central reservoir for holding a supply of the material,

b. two side booms for disposition in the working position transversely of the direction of travel with one boom on each side of the reservoir, each boom including an inner boom member and an outer boom member, the inwardly disposed end of each of the inner boom members being interconnected with the reservoir by spaced bearings for pivoting about an axis extending in the direction of travel for swinging of the inner boom members to a generally upright transport position,

c. a plurality of conduits connected to the reservoir for receiving material therefrom and mounted on the side boom for delivery of the material to spaced discharge points disposed along the booms,

the improvement which comprises:

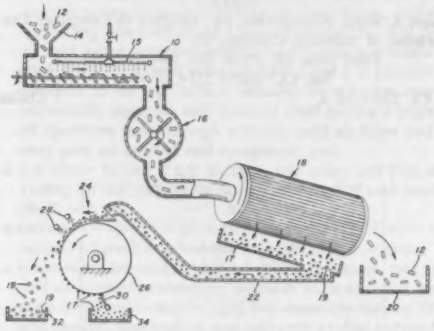
d. each outer boom member being pivotally mounted on its inner boom member on an axis disposed vertically with the side booms in the working position for folding of the outer boom member into a position aligned with the inner boom member in the direction of travel, for the transport position.

4,020,992
SEPARATION OF JOINED PLASTIC AND METAL COMPONENTS

Wayne W. Binger, New Kensington; John W. Collins, III, Leechburg; Melvin R. Fahnestock, Apollo, and George H. Stuppy, Atglen, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 20, 1975, Ser. No. 633,680
Int. Cl.² B02C 23/18
U.S. Cl. 241—18 4 Claims

1. A method of separating joined plastic and metal components in the form of aluminum closures with plastic liners therein comprising chilling the components to approximately −150° F to −250° F until the plastic becomes brittle, impacting the chilled components in a hammermill in which the hammers are spaced from the confining means a distance approximately equal to the extent of the closure skirt from its end wall to liberate the plastic from the metal without shredding the

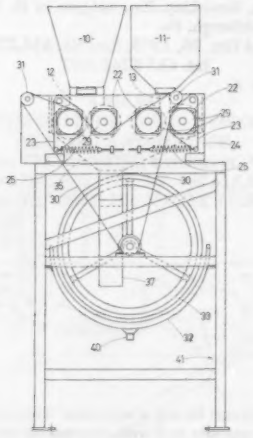


components and separating the chilled plastic components from the metal components.

4,020,993
METHOD OF AND MEANS FOR LIQUID EXTRACTION FROM GALL BLADDERS

Lyndon F. Frazerhurst, Hamilton; Anthony J. Robinson, Johannesburg, and Peter G. Macfarlane, Frankton, all of New Zealand, assignors to New Zealand Inventions Development Authority, Wellington, New Zealand

Filed May 20, 1975, Ser. No. 579,206
Claims priority, application New Zealand, May 20, 1974, 174311
Int. Cl.² B02C 23/10
U.S. Cl. 241—24 14 Claims



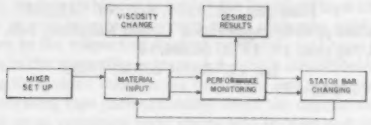
1. A method of collecting gall rom animal bladders wherein a supply of animal bladders is subjected to cutting and squeezing action by a pair of contra-rotating rollers to separate the gall liquid from the cut bladders, one of said rollers having circumferential V-shaped ridges and grooves formed in its surface with at least one scallop formed in each ridge, the liquid and the cut bladders passing to a perforated rotating drum and the liquid passing through the perforations in the drum into a trough.

4,020,994

METHOD OF CORRELATING THE ROTOR AND STATOR IN A MIXER-REFINER-REACTOR

Edward H. Cumpston, 43 Monument Ave., Old Bennington, Vt. 05201

Filed Jan. 28, 1976, Ser. No. 653,072
Int. Cl.² B02C 7/12
U.S. Cl. 241—30 8 Claims



1. A method of correlating a generally cylindrical stator and rotor for working on a predetermined, high-viscosity material in the working region of a continuous mixer-refiner-reactor, said stator and rotor having confronting surfaces with discrete raised bars arranged so some of said bars feed said material and some of said bars retard said material, said method using preliminary steps of:

a. forming said rotor with said discrete bars of a total working area estimated as appropriate for forming said material into a continuous layer around said stator, giving said rotor bars a sufficient grip on said layer of material to move said layer of material generally circumferentially around said stator as a function of the input rate of said material, and making said rotor bars move through said layer of material as said layer of material moves;

b. forming said stator with said discrete bars oriented to establish a proportion of predominance of feed bars for advancing said material from the input to the output of said mixer-refiner-reactor as said circumferential movement of said material occurs;

c. forming said stator with an amount of radial gap between said rotor bars and the inside surface of said stator and with said discrete bars of a total working area and height for resisting said circumferential movement of said layer of material sufficiently so that, in response to each increment of said material input to said mixer-refiner-reactor, said layer of material is temporarily increased in depth to require said rotor bars to engage and move through said increased depth and apply working energy to said layer of material so that a given input rate establishes a rotor bar working depth in said layer of material;

d. driving the rotor of said mixer-refiner-reactor at sufficient RPM to keep said material from lodging between said rotor bars;

e. inputting said material into said mixer-refiner-reactor; and

f. monitoring the power consumed by said mixer-refiner-reactor as evidence of the work done by said rotor on said layer of material; and said method comprising:

g. changing said stator bars by using at least one of a plurality of relationships between said stator bars and said rotor working depth, said relationships being responsive to input of said material into said mixer-refiner-reactor and comprising:

1. increasing said total working area of said discrete stator bars increases said rotor working depth;

2. increasing said height of said stator bars increases said rotor working depth;

3. increasing said radial gap between said rotor bars and the inside surface of said stator increases said rotor working depth; and

4. decreasing said proportion of predominance of said feed bars in said stator increases said rotor working depth;

h. making said stator bar changes according to said relationships to increase said rotor working depth if said consumed power is inadequate, to increase said rotor working depth if said consumed power surges, to reduce said rotor working depth if said material clogs in said mixer-refiner-reactor and consumed power is excessive, and to reduce said rotor working depth if said consumed power continues after input of said material stops; and

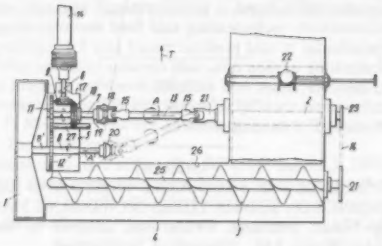
i. continuing with steps d–h until said consumed power is proportional to the rate of input of said material to said mixer-refiner-reactor, as an indication that said layer of material is moving through said stator bars and said rotor bars are moving through said rotor working depth of said layer of material.

4,020,995

DRIVE SYSTEM FOR CHOPPING APPARATUS

Josef Pürrer, Gottmadingen, Germany, assignor to Maschinenfabrik Fahr Aktiengesellschaft, Gottmadingen, Germany

Filed Nov. 7, 1975, Ser. No. 630,021
Claims priority, application Germany, Nov. 8, 1974, 2453125
Int. Cl.² A01D 75/08
U.S. Cl. 241—101.2 6 Claims



1. A chopping apparatus comprising:

a support having a pair of opposite sides;

chopping means on said support at one of said sides including a chopping reel rotatable in a forward direction for chopping crop and in a reverse direction;

discharge means on said support at the other side thereof spaced from said chopping reel and including a fan rotatable in one direction for blowing out chopped crop;

conveyor means on said support extending between said reel and said fan for transporting chopped crop from the former to the latter;

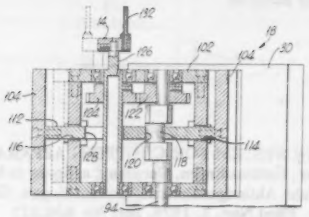
a transmission on said other side of said housing between said reel and said fan, said transmission having a housing, a unidirectionally rotatable input shaft a pair of mutually oppositely rotatable and parallel output shafts perpendicular to said input shaft and projecting from said housing one of said output shafts being permanently connected to said fan and both of said output shafts having their projections from said housing formed with ends exposed toward said reel, and gearing in said housing continuously connecting both said output shafts for rotation in opposite sense to said input shaft; and

means for connecting either of said ends to said reel for rotatably driving same, whereby said reel is rotated in reverse when connected to said end of said one output shaft and forwardly when connected to said end of the other output shaft, said exposed ends being both provided with respective snap couplings, and said connecting means including a shaft having one end provided with a universal joint connected to said reel and another end provided with a snap coupling releasably engageable with either of said snap couplings of said output shafts, said fan being mounted on an end of one of said output shafts opposite its said end projecting toward said reel.

4,020,996
METHOD AND APPARATUS FOR WINDING ELONGATED COILS

Wyman L. Deeg, Vernon Hills, Ill., assignor to C. P. Clare & Company, Chicago, Ill.

Filed Dec. 3, 1975, Ser. No. 637,388
Int. Cl.² H01F 41/06; B65H 81/06
U.S. Cl. 242—7.03 18 Claims

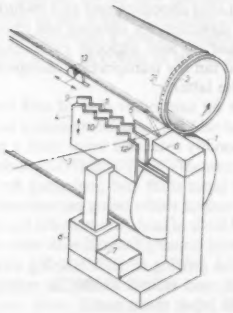


1. Apparatus for winding a length of elongated material onto a material receiving element comprising means including a feed member for paying out said elongated material, means coupled to said feed member for rotating said feed member in a circular orbit about a predetermined axis and means for simultaneously reciprocating said feed member along a path perpendicular to said predetermined axis for superimposing a reciprocating motion onto said circular orbit for orbiting said feed member about said material receiving element in a non-circular orbit thereby to wind said elongated material onto said material receiving element.

4,020,997
APPARATUS FOR PRODUCING WASTE AND RESERVE WINDINGS ON BOBBIN TUBES ON WINDING MACHINES

Hugo Schär, Dattlikon, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Aug. 1, 1975, Ser. No. 601,195
Claims priority, application Switzerland, Sept. 12, 1974, 12407/74
Int. Cl.² B65H 54/02
U.S. Cl. 242—18 PW 9 Claims



1. An apparatus for producing a waste bunch and thread reserve windings on a bobbin tube on a winding machine, said apparatus including

a thread guide comb having a plurality of teeth thereon;

a thread lifting comb having a plurality of teeth identical to said teeth of said guide comb;

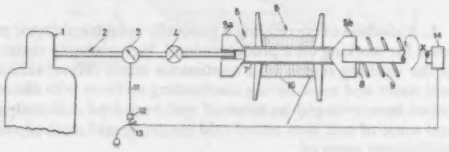
each said comb having a tooth arrangement symmetrical with respect to an input start section for simultaneously forming a waste bunch and two reserve windings for double packages on a common tube; and

means for lifting and lowering at least one of said combs at a frequency corresonding at least to the frequency of rotation of the bobbin tube.

4,020,998
METHOD AND APPARATUS FOR WINDING BOBBINS

José Carbonell, Bottmingen; Rolf Hasler, Oberwil, both of Switzerland, and Roland Walliser, Rixheim, France, assignors to Sandoz Ltd., Basel, Switzerland

Filed Jan. 30, 1975, Ser. No. 545,334
Claims priority, application United Kingdom, Feb. 5, 1974, 5174/74; Dec. 17, 1974, 54384/74
Int. Cl.² B65H 63/08, 59/00
U.S. Cl. 242—39 14 Claims

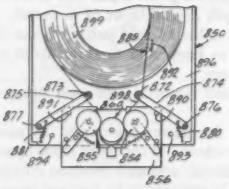


1. A method of winding bobbins having a predetermined radial fluid permeability which comprises winding yarn or fabric on a hollow permeable core, passing a fluid radially through the windings on the core during winding of the yarn or fabric onto the core, the fluid pressure within the core changing due to the yarn or fabric winding onto the core, and terminating the winding when a predetermined fluid pressure is attained in the core.

4,020,999
ENDLESS LOOP CARTRIDGE FOR VIDEO

Marvin Camras, Glencoe, Ill., assignor to IIT Research Institute, Chicago, Ill.

Continuation-in-part of Ser. No. 60,806, Aug. 4, 1970, Pat. No. 3,725,608, Ser. No. 258,750, June 1, 1972, Pat. No. 3,805,288, and Ser. No. 282,275, Aug. 21, 1972, Pat. No. 3,849,797. This application Apr. 2, 1973, Ser. No. 346,869
Int. Cl.² G11B 23/10
U.S. Cl. 242—55.19 A 4 Claims



1. A tape cartridge assembly comprising a cartridge having a bottom wall with an aperture therein for providing access to the interior of the cartridge, having a front side in front of said aperture, and having a capstan receiving space interiorly thereof and in alignment with the aperture in said bottom wall with respect to a direction substantially normal to the bottom wall for accommodating a capstan drive assembly having an axis of rotation substantially normal to the bottom wall and extending into said cartridge through said aperture in said bottom wall, a reel mounted in said cartridge rearwardly of said aperture and rotatable on a central axis thereof disposed substantially normal to said bottom wall, a coil of record tape wound on said reel and a length of such record tape extending from the inner side of said coil to and along a tape loading path at said front side of said cartridge in front of said aperture, and extending from the tape loading path to the outer

side of the coil, such that the tape is in the form of an endless loop with the length of tape being adapted to extend about a capstan drive assembly at the capstan receiving space of the cartridge, shiftable tape guide elements mounted in said cartridge for movement from respective loading positions to respective retracted positions, said tape guide elements having respective tape engaging faces located adjacent the respective opposite sides of said aperture at the front side of said cartridge in the respective loading positions of said tape guide elements, and operable for engaging the length of tape to hold the tape at said tape loading path while said tape guide elements are in the respective loading positions, said tape guide elements in the respective retracted positions conditioning the cartridge for a video transducing operation and accommodating an operating tape path extending about the capstan receiving space at an operating level above said bottom wall during a video transducing operation, said tape guide elements in the respective loading positions being disposed with said tape engaging faces thereof substantially parallel to the central axis of the reel and substantially normal to the plane of the bottom wall of the cartridge and at a level relative to the bottom wall substantially corresponding to the operating level of the record tape at the capstan receiving space of the cartridge during a video transducing operation, means comprising said tape guide elements in the respective retracted positions providing a configuration for said operating tape path accommodating transport of the record tape at a video transducing speed, and means guiding the movement of said tape guide elements from the respective retracted positions to the respective loading positions for shifting the tape from the said operating tape path to the loading path without substantially changing the level of the tape relative to the bottom wall of said cartridge.

4,021,000

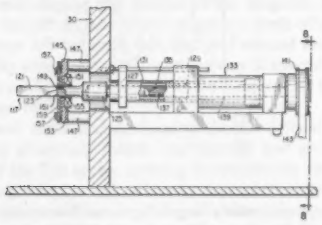
AUTOMATIC CAPACITOR WINDING MACHINE

Armand A. DeMauro, Wayne, N.J., assignor to Universal Manufacturing Corporation, Paterson, N.J.

Filed Mar. 25, 1975, Ser. No. 561,981

Int. Cl.² B65H *39/16*

U.S. Cl. 242—56.1 **5 Claims**



1. Apparatus for removing an object from an arbor including:

an elongate arbor mounted for axial rotation and translation;

a substantially planar member having a central opening slightly larger than the diameter of said arbor whereby said planar member is rotatable about said arbor, said arbor being received within said opening and said arbor comprising the sole means for structurally supporting said planar member;

means coupled to said arbor for translating said arbor axially from a first position to a second position; and

means positioned adjacent to said planar member for limiting the axial movement of said planar member when said arbor translates axially.

4,021,001

CORES FOR USE IN REELING UP SHEET MATERIALS

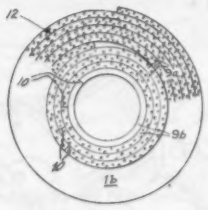
Alan Conrad Sproat, Dumfries, Scotland, assignor to Imperial Chemical Industries Limited, London, England

Filed Apr. 21, 1976, Ser. No. 678,879

Claims priority, application United Kingdom, Apr. 22, 1975, 16561/75

Int. Cl.² B65H *75/40*

U.S. Cl. 242—68.5 **8 Claims**



1. A core suitable for use in reeling up sheet material, the core having an axially extending form-stable inner region and permanently provided around said inner region a resiliently compressible outer surface region comprising layers of a resiliently compressible film of foamed crystalline aliphatic polyolefin material.

4,021,002

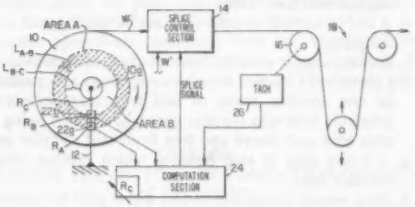
AUTO-SPLICE SYSTEM

Edward F. Melhofer, Norfolk, Mass., assignor to Butler Automatic, Inc., Canton, Mass.

Continuation-in-part of Ser. No. 589,365, June 23, 1975, abandoned. This application June 23, 1976, Ser. No. 699,191

Int. Cl.² B65H *19/18, 25/04*

U.S. Cl. 242—58.1 **12 Claims**



1. An apparatus for determining independently of web caliper that a moving web roll has reached a preselected radius comprising

A. sensing means to detect when the roll has reached a first known radius, and a second known radius,

B. means responsive to the output of the sensing means for generating a first value dependent upon the cross-sectional area of the roll between said known radii,

C. means for generating a second value dependent upon the cross-sectional area of the roll between said second known radius and the preselected radius,

D. means for generating a third value proportional to the length of web being drawn to or from the roll that results as the roll size changes from one known radius to the other known radius,

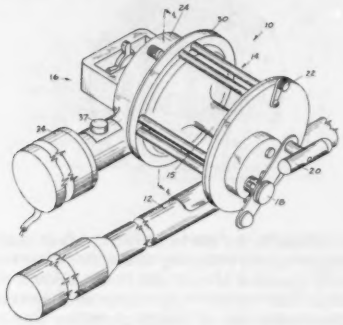
E. means for processing the three values to determine the length of web between the second known radius and the preselected radius, and

F. means for monitoring the length of web traveling to or from the roll beginning when the roll size reaches the second known radius, said monitoring means producing an output signal when the monitored web length equals said determined length.

4,021,003
POWER DRIVEN FISHING REEL

William B. Watkins, 1118 Crestwood Drive, Winston-Salem, N.C. 27101

Continuation-in-part of Ser. No. 545,689, Dec. 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 356,891, May 3, 1973, abandoned. This application Jan. 8, 1976, Ser. No. 647,548
Int. Cl.² A01K *89/017*
U.S. Cl. 242—84.1 A 7 Claims



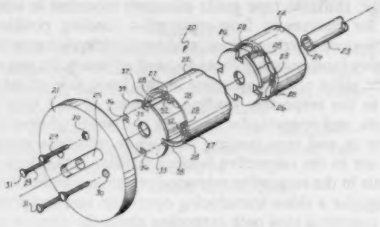
1. In a fishing reel having a frame, a single shaft, a spool carried on said shaft and manual and power driven rewind units fro rotating said shaft, the improvement comprising:
a. a housing for said power driven rewind unit secured to said frame;
b. an adaptor coupling carried on said shaft, said adaptor coupling being adapted to engage and disengage from said reel shaft;
c. an actuating means for manipulating said adaptor coupling so that said coupling will selectively engage or disengage said reel shaft;
d. a sleeve carried on said shaft and engaging said adaptor coupling;
e. a circular gear rotatably mounted on said sleeve;
f. a plurality of friction members engaging said circular gear or one another, some of said friction members being rotatable with said circular gear while others being rotatable with said sleeve and free from said circular gear;
g. a worm gear in said housing which meshes with said circular gear;
h. drive means connected to said worm gear for supplying a rotary movement to said worm gear; and
i. means for forcing said friction member into contact with one another and said circular gear, whereby a friction force is produced to cause said sleeve and said shaft to be rotated when said adaptor coupling is engaged with said shaft.

4,021,004
SPOOL ASSEMBLY

George A. Poteat, Charlotte, N.C., assignor to Engineered Plastics, Incorporated, Gibsonville, N.C.

Continuation-in-part of Ser. No. 461,309, April 16, 1974, abandoned. This application July 23, 1975, Ser. No. 598,409
Int. Cl.² B65H *75/14*
U.S. Cl. 242—118.6 19 Claims

1. A spool assembly comprising a pair of end flanges, an exterior hollow tube formed for supporting material thereon and disposed between said end flanges, said exterior tube having a plurality of interior, longitudinally extending, integral projections providing fastener-retaining slots extending from adjacent said flanges, a plurality of fasteners retained in said flanges and slots to secure said flanges to the ends of said tube, and end reinforcing plugs disposed in each end of said exterior tube in reinforcing engagement with the interior thereof, said plugs having peripheral notches aligned with and encompassing said projections adjacent said flanges to prevent spreading

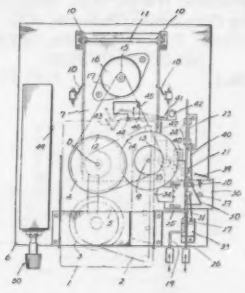


thereof and thereby retain said projections in fastener securing position.

4,021,005
FRONT LOADING CASSETTE TAPE MACHINE

Shigeji Takemoto, 8-7 Asahi-cho, Gakuen, Nara, and Kazuhisa Nishitani, 7-627 Nakagaideo, Osaka, Daito, both of Japan

Filed May 13, 1975, Ser. No. 577,001
Claims priority, application Japan, July 13, 1974, 49-80505; Sept. 3, 1974, 49-101707
Int. Cl.² G03B *1/04*; G11B *15/32*, *23/04*
U.S. Cl. 242—198 18 Claims



1. A tape recorder comprising a case for accommmodating a cassette wherein are located a magnetic tape and reels for winding said magnetic tape, a winding reel shaft for supporting and driving a winding reel, a capstan shaft for forwarding the magnetic tape at constant speed, said shafts being rotatably mounted on a plate, an injecting lever for engaging and releasing the winding reel shaft and the capstan shaft to and from a cassette positioned in said case, locking means for keeping said winding reel shaft and the capstan shaft out of engagement with the cassette, means linked with the cassette to disengage the locking means to engage the winding reel shaft and the capstan shaft with said cassette a tapered element being formed on said injecting lever; a slipping element which is contiguous to said tapered element being formed on said plate; said plate being movable to the accomodating case when the injecting lever is moved forward; also the movable plate can be detached from the accomodating case by moving the injecting lever backward.

4,021,006

CONTAINER FOR MAGNETIC TAPE

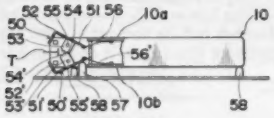
Toshio Morimoto, and Takehisa Takamiya, both of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 14, 1975, Ser. No. 632,162

Claims priority, application Japan, Nov. 20, 1974, 49-134105; Nov. 20, 1974, 49-134106; Nov. 21, 1974, 49-142174[U]; Nov. 21, 1974, 49-142175[U]; Nov. 21, 1974, 49-142176[U]; Dec. 9, 1974, 49-149401[U]; Dec. 9, 1974, 49-149402[U]; Dec. 10, 1974, 49-149930[U]

Int. Cl.² G03B *1/04*; G11B *15/32*, *23/04*

U.S. Cl. 242—199 8 Claims



1. A tape container for accommodating therein a magnetic tape designed for use in a magnetic recording and/or reproducing apparatus of the type having a container receiving chamber, at least one recording and/or reproducing transducer supported in position for movement between engaged and disengaged positions, and at least one capstan and an idler wheel cooperative with said capstan for driving the magnetic tape, said tape container comprising:

a housing of generally rectangular configuration including first and second generally rectangular spaced plate members and a peripheral wall extending between said first and second plate members along three of the sides thereof;

a first access opening means, defined in said housing along the fourth side thereof, for allowing access to a portion of the magnetic tape and for receiving the transducer when moved to the engaged position thereof so that the transducer may engage said portion of the magnetic tape;

first and second reels to which respective ends of the magnetic tape are secured, said first and second reels being rotatably supported within said housing in spaced relation to each other, each of said first and second reels having at least one radially outwardly extending flange;

second and third access opening means defined in said housing along said fourth side thereof and at opposite sides of the first access opening for selectively alternately receiving therethrough, when the tape container is placed within the container receiving chamber, the capstan in readiness for driving the magnetic tape from either of one of the said first and second reels towards the other of said first and second reels in cooperation with the idler wheel;

protective covering means, supported by said housing, for movement between a closed position covering said first access opening means and an open position permitting the transducer to extend into said first access opening means and to contact said portion of the magnetic tape, said protective covering means comprising first and second lids pivotally supported by said housing, and means for biasing said first and second lids toward each other to said closed position; and

means, formed in one of said three sides of said housing, for operating a switching element forming a part of an electric circuit of the apparatus when said container is placed in the container receiving chamber of the apparatus.

4,021,007

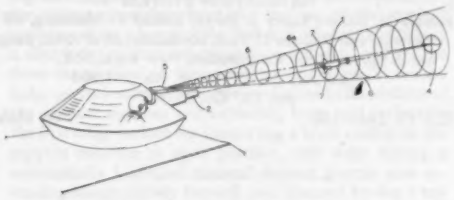
PITCH-YAW STABILIZATION SYSTEM

Frank S. Coxe, Santa Ana, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Oct. 11, 1974, Ser. No. 514,243

Int. Cl.² F41G *7/14*, *9/00*, *7/00*

U.S. Cl. 244—3.13 4 Claims



1. In a flight vehicle having flight control means and using a remote transmitted control beam; a pitch-yaw stabilization system comprising:

1 a. focusing lens means mounted in the rear of said vehicle to receive the transmitted beam, the directional axis of said lens means being parallel to the longitudinal axis of said vehicle;

b. a beam detector assembly comprising four separate quadrant shaped transducers positioned together in substantially a circle to form a vertical and horizontal axis with respect to said vehicle passing between said quadrant shaped transducers, said detector being fixed in a plane perpendicular to the directional axis of said lens means and forward of said lens in said vehicle near the focal point of said lens means;

c. a separate signal output lead from each of said quadrant shaped transducers;

d. signal handling means connected to said transducer output leads for producing corrective pitch and yaw rate signals in accordance with the rate of change of said vehicle about the pitch and yaw axes thereof relative to the line of sight of the transmitted beam; and

e. means operatively connected from said signal handling means to the flight control means of said vehicle for nulling out oscillations of said vehicle about said pitch and yaw axes.

4,021,008

DEVICE FOR PREVENTING ICE FORMATION ON PARTS OF AIRCRAFT

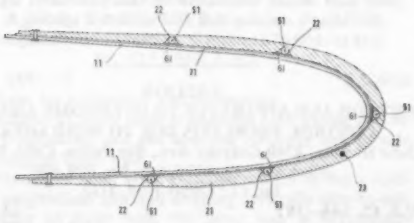
Fritz Eichenauer, Kandel, Pfalz, Germany, assignor to Fritz Eichenauer, Germany

Filed May 20, 1975, Ser. No. 579,152

Claims priority, application Germany, May 22, 1974, 2424784; Dec. 5, 1974, 2457502

Int. Cl.² B64D *15/12*

U.S. Cl. 244—134 D 16 Claims



1. A device for preventing ice formation upon an external part of an aircraft, comprising at least one electrical resistance heater member mounted upon said part and embedded at least

partially in a metallic shell consisting of material of good thermal conductivity partially sheathing said part, said electrical resistance heater member being a miniature tubular heater.

4,021,009

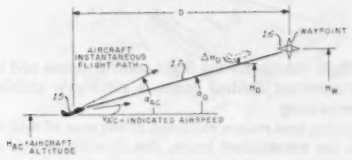
VERTICAL PATH CONTROL FOR AIRCRAFT AREA NAVIGATION SYSTEM

Donald H. Baker; Larry J. Bowe; Kenzel P. Manning, all of Phoenix, and William C. Post, Scotisdale, all of Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed July 24, 1975, Ser. No. 598,904

Int. Cl.² G05D 1/08

U.S. Cl. 244—180 **60 Claims**



1. In an area navigation system for aircraft, apparatus for controlling the vertical flight path of the aircraft when ascending or descending to a waypoint having an altitude and an at-or-above or an at-or-below altitude requirement associated therewith comprising

vertical steering signal generating means for generating a vertical steering signal representative of deviations of the airspeed of said aircraft from a reference airspeed,

pitch axis control means responsive to said vertical steering signal for controlling the pitch attitude of said aircraft so as to reduce said speed deviations to zero,

boundary parameter computing means for providing a boundary parameter signal representative of the value of a suitable aircraft parameter on a boundary flight path defined by a straight line from the instantaneous location of said aircraft to said waypoint at said altitude thereof,

aircraft parameter computing means of providing an aircraft parameter signal representative of the instantaneous actual value of said aircraft parameter,

means for providing a waypoint data signal representative of said at-or-above or said at-or-below designation of said waypoint,

comparator means responsive to said boundary parameter signal, said aircraft parameter signal and said waypoint data signal for comparing said aircraft parameter signal to said boundary parameter signal in accordance with said waypoint data signal and providing a pilot alert signal when said actual value of said aircraft parameter relative to said boundary value thereof indicates an actual aircraft flight path tending to violate said at-or-above or said at-or-below altitude requirement of said waypoint, and

pilot alert means responsive to said pilot alert signal for providing a warning that said aircraft is tending to violate said at-or-above or said at-or-below altitude requirement.

4,021,010

METHOD AND APPARATUS TO OVERCOME AIRCRAFT CONTROL PROBLEMS DUE TO WIND SHEAR

John H. Bliss, 2740 Graysby Ave., San Pedro, Calif. 90732

Filed Aug. 29, 1975, Ser. No. 608,408

Int. Cl.² G05D 1/08, 1/12

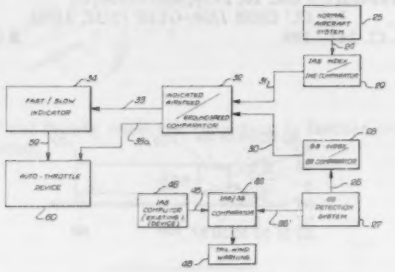
U.S. Cl. 244—182 **23 Claims**

1. A method of controlling the power to be applied to an aircraft engin during a landing approach, whether windshear conditions exist or not, comprising the steps of:

a. monitoring deviation of actual airspeed from desired airspeed on the approach and deviation of actual groundspeed from desired approach groundspeed on the approach and,

b. employing such deviations in such a manner so that the approach speed is controlled by whichever of the speeds is lower compared to the associated desired speed, and using this speed parameter to control power to maintain a stabilized speed condition during the final approach.

8. An apparatus useful in determining power to be applied to an aircraft engine during a landing approach, comprising



a. first means for monitoring deviations of acutal aircraft airspeed from desired approach airspeed, and deviations of actual aircraft groundspeed from desired approach groundspeed, and

b. second means coupled to said first means for providing an indication as to which of said deviations is the lower compared to the associated desired value, from which a pilot can maintain a stabilized speed condition above a safe value by adjusting engine power.

4,021,011

DEVICE FOR ATTACHING A SCAFFOLDING BRACKET TO A VERTICAL WALL SURFACE

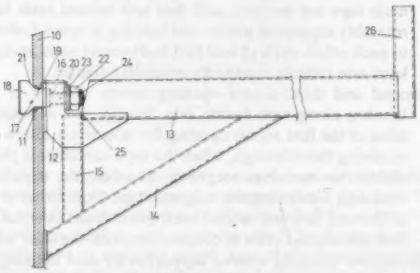
Kurt Karlsson, Kungsbacka, and Thorsten Lundberg, Askim, both of Sweden, assignors to AB Gotaverken, Sweden

Filed Nov. 25, 1975, Ser. No. 635,102

Claims priority, application Sweden, Dec. 27, 1974, 7416294

Int. Cl.² A46G 29/02

U.S. Cl. 248—235 **4 Claims**



1. A device for attaching a scaffolding bracket to a vertical wall surface having apertures formed as elongated slots, said bracket comprising a carrying portion including a cantilever arm adapted to carry scaffolding material, the improvement of

a mounting portion at the inward end of the bracket,

a passage in said mounting portion extending substantially parallel to the direction of said arm, and through opposed faces of said mounting portion, one said opposed face being separated from the carrying portion and comprising one side of an upwardly open notch,

a single attaching member formed as a bolt fitted into said

passage, and having an enlarged, flattened head at one end and a threaded portion at its opposite end,

said head having a breadth slightly less than the length of a wall slot, and a thickness slightly less than the breadth of said wall slot,

means for holding said bolt so the head, in use, will present its broadest measure perpendicularly to the length of said slot, and for preventing rotation of said bolt in said passage, the bolt having sufficient length to present said head at a distance outside the other of said opposite faces, while presenting at least part of the threaded portion in said notch, and

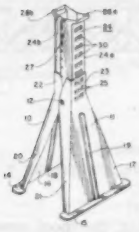
a nut rotatably mounted on said threaded portion and disposed in said notch for permitting access to said nut by means of a tool so that the nut can be loosened, said bracket including a support projecting vetically from said mounting portion so that the support, when attached to a cable or the like, can be pulled on and rotated remotedly, to orient the head of the bolt so that the bracket will fall from the slot in which it is normally mounted when used to support scaffolding material.

4,021,012

JACK STAND

Jack V. Miller, Sierra Madre, Calif., assignor to Acroform, Los Angeles, Calif.

Filed June 18, 1976, Ser. No. 697,399
Int. Cl.² F16M *13/00*
U.S. Cl. 248—352 **8 Claims**



1. A jack stand comprising a pair of legs;

each leg including a portion extending laterally to provide a base for support of the jack stand when said legs are spread partially apart;

means pivotally mounting said legs to move to a position generally adjacent to each other, outward to an extreme support position;

the upper ends of said legs defining a substantially closed tubular portion;

said leg portions including inwardly extending teeth in spaced opposite juxtaposition within said aperture;

a tubular member dimensioned to pass through said aperture with the surface of said tube member in close proximity to said teeth;

said tube member including recess portions interlocking with said teeth when the upper portion of said legs are positioned defining said aperture;

the upper end of said tube including means for holding a load.

4,021,013

BOOK HOLDING DEVICE

Alva J. Wiersma, Denver, Colo., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

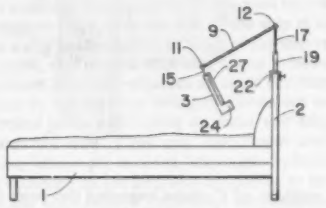
Filed May 3, 1976, Ser. No. 682,616
Int. Cl.² F21V *33/00*
U.S. Cl. 248—453 **2 Claims**

1. A book holding device for a bed having a headboard, said book holding device comprising

a substantially plate-like support member of substantially rectangular configuration having a surface, a first pair of substantially parallel edges and a second pair of substantially parallel edges substantially perpendicular to and shorter than the first pair of edges bounding the surface;

mounting means swivelly affixed to the support member at an upper of the first pair of edges and swivelly affixed to the headboard of a bed for adjustably selectively positioning said support member relative to the headboard;

ledge means extending from the surface of the support member along a lower of the first pair of edges and having a first ledge surface substantially parallel to and spaced from the surface of the support member and a second ledge surface substantially perpendicular to the surface of the support member and extending from said surface to the first ledge surface for supporting a book resting on the support member in open position, said ledge having a substantially L-shaped channel formed therein and extending longitudinally thereof, said channel having a top slot opening in the second ledge surface, said top slot



being parallel to the first ledge surface, and a side slot opening in the first ledge surface ,said side slot being parallel to the second ledge surface;

cover clamps mounted on the support member at the second pair of edges thereof for releasably retaining the covers of the book in abutment with the surface of said support member; and

page clamp means including a plurality of independent page clamps of substantially L-shape movably mounted in the ledge means for movement in directions parallel to the first pair of edges in proximity with the surface of the support member, each of the page clamps having a first arm movably mounted in the part of the channel opening in the second ledge surface and extending substantially parallel to the surface of the support member from the second ledge surface and a second arm movably mounted in the part of the channel opening in the first ledge surface and extending substantially perpendicular to said surface from the first ledge surface for facilitating manual positioning of said page clamps.

4,021,014

FORM FOR CONCRETE WALLS

William A. Craig, Box 296, R.D. 2, Cheswick, Pa. 15024

Filed Apr. 12, 1976, Ser. No. 675,411
Int. Cl.² E04G *11/04*
U.S. Cl. 249—45 **3 Claims**

1. A form for a concrete wall comprising:

a. a plurality of outer vertical elements each having a vertical longitudinal axis and abutting vertically side-by-side forming an outer wall;

b. a plurality of inner vertical elements each having a vertical longitudinal axis and abutting vertically side-by-side forming an inner wall, the inner wall is horizontally spaced from the outer wall to the desired thickness of the concrete wall;

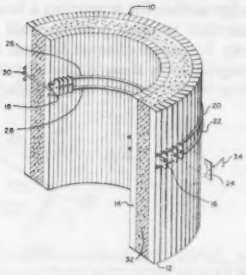
c. a row of a plurality of outer whaler lookout plates each mounted on one of the abutting sides of the outer vertical elements and extending from the outer vertical elements

in a direction away from the space formed between the inner and outer walls;

d. a row of a plurality of inner whaler lookout plates, each mounted on one of the abutting sides of the inner vertical elements and extending from the inner vertical elements in a direction away from the space formed between the inner and outer walls;

e. a pair of parallel outer whaler rods engaging the outer whaler lookout plates which vertically separate the pair of outer rods;

f. a pair of parallel inner whaler rods engaging the inner whaler lookout plates which vertically separate the pair of inner rods;



g. a plurality of C-plates engaging the pairs of inner and outer whaler rods, each C-plate positioned between adjacent pairs of whaler lookout plates;

h. a plurality of rod pins each passing through aligned holes in the outer and inner whaler lookout plates and the C-plates for securing the C-plates in engagement with the whaler rods; and

i. a tie rod passing between two adjacent outer vertical elements and two adjacent inner vertical elements, the tie rod is secured at each end by a rod pin which passes through a hole in the end of the tie rod and holes in a pair of adjacent whaler lookout plates, the end of the tie rod is positioned between the pair of adjacent whaler lookout plates.

4,021,015

MOTOR-EQUIPPED CONTROL DEVICE FOR A VALVE ADJUSTING ROD

Claude Maeder, Nancy, and Jean Georges Sutter, Villers Les Nancy, both of France, assignors to Pont-A-Mousson S.A., Nancy, France

Filed July 2, 1975, Ser. No. 592,691

Claims priority, application France, July 5, 1974, 74.23744

Int. Cl.² F16K *31/04*

U.S. Cl. 251—133 **9 Claims**

1. In a valve adjusting mechanism haing an electric motor with variable reluctance, said motor having a stator attached to a frame of the valve and a rotor disposed concentrically within said stator, said rotor and stator being provided with denticulations having a predetermined angular pitch, and an adjusting rod connected to a valve, the improvement comprising a mating system means connecting the rotor to the adjusting rod to cause said adjusting rod to rotate with said rotor while allowing angular play between the rotor and the adjusting rod at least equal to the angular pitch of the denticulations of the rotor and stator.

4,021,016

VALVES

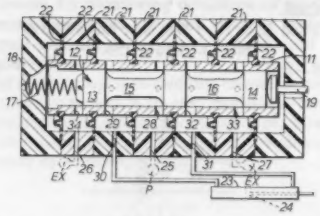
John Charles Humphreys Hart, Sheffield, England, assignor to Bridon Engineering Limited, Sheffield, England

Division of Ser. No. 512,255, Oct. 4, 1974, Pat. No. 3,952,996. This application Sept. 4, 1975, Ser. No. 610,395

Claims priority, application United Kingdom, Oct. 5, 1973, 46525/73

Int. Cl.² F16K *27/04*; F15B *13/04*

U.S. Cl. 251—324 **3 Claims**



1. A valve comprising:

a. a valve housing comprising a plurality of juxtaposed tubular members;

b. a ported sleeve;

c. a spool member, the spool member being reciprocably mounted within the ported sleeve, and

d. a plurality of diaphragm members, the diaphragm members being formed of synthetic plastics material and being located to mount the sleeve within the valve housing, one of said diaphragm members being sealingly engaged between each adjacent pair of tubular members.

4,021,017

THIRD MEMBER HANDLING JACK

Ernest E. Adams, 4345 E. Freemont, Phoenix, Ariz. 85040

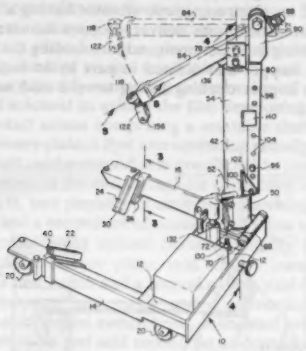
Continuation-in-part of Ser. No. 666,771, March 15, 1976, abandoned. This application Oct. 6, 1976, Ser. No. 730,128

Int. Cl.² B65G *7/08*

U.S. Cl. 254—8 B **12 Claims**

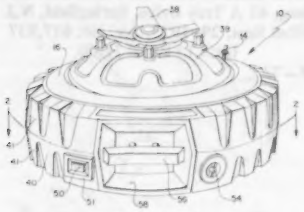
1. A handling jack for large truck gear boxes or the like comprising: a portable base frame; said frame being provided with a base adapted to carry a gear box or the like; upright column structure; pivot means pivotally mounting said column structure on said base frame; said pivot means having a generally horizontal pivotal axis; said column structure having a longitudinal axis disposed at an angle to said pivotal axis; extendable means adapted to extend said column means in a direction along said longitudinal axis; a boom pivotally coupled to said column structure on a generally horizontal axis; said pivot means permitting said column and boom structure to pivot away from a position over said base frame to a low level position; said extendable means coupled to said boom for

pivoting it on said last mentioned horizontal axis; and suspension means carried by said boom for suspending and support-



ing a gear box, such as a third member of a truck, in connection with said boom.

4,021,018
JACKING DEVICE
Velu K. K. Dasan, Tamil Nadu, India, assignor to Ashok Kumar Shetty, Madras, India, a part interest
Filed May 10, 1976, Ser. No. 685,063
Int. Cl.² B66F 3/24
U.S. Cl. 254—93 H **8 Claims**



1. A lifting jack device for automobiles and the like having the overall shape of an automobile tire and rim and accordingly adapted for storage in similar attitudes comprising,

a generally planar supporting base for supporting said device in an operative jacking mode,

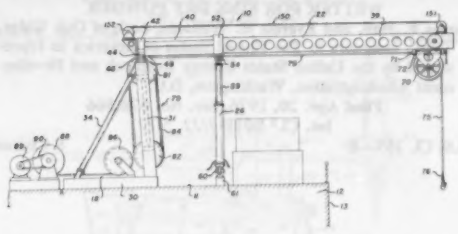
a closed chamber for receipt of pressurized air, said chamber of generally toroidal configuration including a central opening therethrough and having a relatively flat base of ring-like configuration,

a cylinder having a closed lower base portion and an open top disposed entirely within the opening of said chamber, said cylinder base portion disposed within the confines of said ring-like chamber base and generally coplanar therewith so as to cooperatively form said supporting base,

at least one piston longitudinally slidable within said cylinder and closing said open top thereof, said piston having a jack arm connected thereto and longitudinally extendable beyond said chamber for application of thrust to objects to be lifted by means of the application of pressurized air to said piston, and

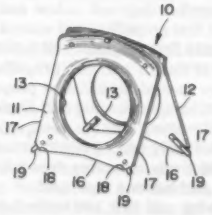
separate valve means for pressurizing said chamber with air for admitting pressurized air from said chamber to said cylinder beneath said piston and for withdrawing pressurized air from said cylinder.

4,021,019
HEAVE COMPENSATING CRANES
Raymond J. Sanders, Vancouver, Canada, assignor to British Columbia Research Council, Vancouver, Canada
Filed Mar. 24, 1975, Ser. No. 561,331
Int. Cl.² B66D 1/48
U.S. Cl. 254—172 **20 Claims**



1. A heave compensating crane to be mounted on a ship and adapted to support loads over the side of the ship at constant depths in the water unaffected by motions of the ship resulting from wave action, said crane comprising a base to be mounted on a ship, a boom mounted adjacent an inner end thereof on a pivot carried by the base for swinging movement in a substantially vertical plane and having an outer end adapted to extend towards the side of the ship, said boom comprising inner and outer telescopic sections, telescopic hydraulic jack means to be mounted on the ship and connected to the boom spaced from the pivot thereof to support the boom, a pulley mounted on the outer section of the boom and positioned at the side of the ship when the crane is in operation, a cable threaded over the pulley and having a free end to which a load can be attached, said cable extending from the pulley towards the inner end of the boom, winch means for reeling in and paying out the cable, means for shifting said outer section inwardly and outwardly relative to the inner section of the boom to shift the pulley towards and away from the base, and a passive control system comprising accumulator means connected to the jack means for retaining the boom through said jack means in position maintaining the load attached to and supported by the cable substantially unaffected by ship motion resulting from wave action.

4,021,020
ROAD BARRICADE AND METHOD OF MAKING SAME
Floyd V. Decker, P.O. Box 790, Arnold, Calif. 95223
Filed Apr. 5, 1976, Ser. No. 673,969
Int. Cl.² E01F 9/00
U.S. Cl. 256—1 **8 Claims**



1. A road barricade comprising a first sidewall portion of a given size separated from a vehicle tire, said first sidewall portion including one circular bead and having a convex major surface and an opposite concave major surface; a second sidewall portion separated from a vehicle tire of a size comparable to said given size vehicle tire, said second sidewall portion including one circular bead and having a convex major surface and an opposite concave major surface; and fastener means joining said first and said second sidewall

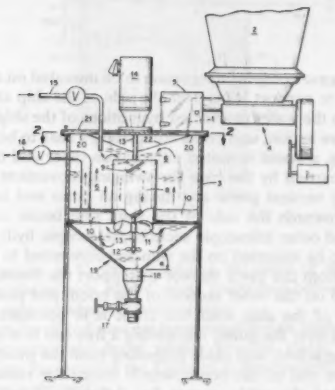
portions to each other with said circular beads thereof in substantially coaxial alignment and said convex major surfaces thereof adjacent and facing each other, said fastener means being located within a sector defining less than 180° of the periphery of said circular beads thereof.

4,021,021

WETTER FOR FINE DRY POWDER

James E. Hall, and Everett H. Williams, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 20, 1976, Ser. No. 678,566
Int. Cl.² B01F *7/22, 5/12*
U.S. Cl. 259—8 **8 Claims**



1. A wetter for fine dry powders comprising:

a. a wetting tank having a square horizontal cross section and a bottom end closure in the shape of an inverted four-sided pyramid for receiving liquid for wetting said powder;

b. an open ended flow control cylinder disposed centrally within said wetting tank with its longitudinal axis oriented vertically;

c. a plurality of upper and lower mixing baffles extending between said flow control cylinder and the inner surface of said wetting tank;

d. a first shaft-mounted propeller disposed immediately below and coaxial with said flow-control cylinder for causing liquid to flow downward through said cylinder;

e. a second propeller disposed below and on a common shaft with said first propeller, said second propeller being smaller than said first propeller and having a pitch direction opposite to that of said first propeller to oppose the downward flow caused by said first propeller;

f. means for continuously feeding said fine dry powder into the top of said wetting tank;

g. means for selectively adding liquid to said wetting tank;

h. means for selectively removing mixed liquid and wetted powder from said wetting tank; and

i. means for driving said first and second propellers.

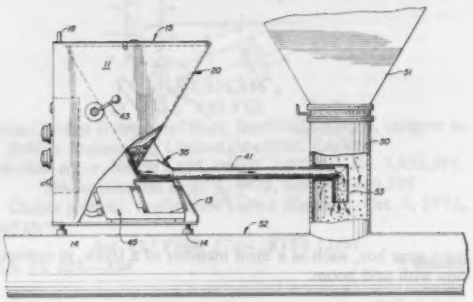
4,021,022

PIGMENT METERING AND MIXING APPARATUS

John J. Satterfield, III, Akron, Ohio, and Kenneth E. Swain, Hoffman Estates, Ill., assignors to Americhem, Inc., Cuyahoga Falls, Ohio

Filed Aug. 27, 1975, Ser. No. 608,191
Int. Cl.² B01F *5/00;* **B65G** *27/24*
U.S. Cl. 259—18 **5 Claims**

1. In combination, a vertical supply throat for supplying granular or comminuted plastic resin to an extruder, apparatus for metering a controlled amount of granular or comminuted color concentrated into said throat, comprising a color concentrate storage hopper having an opening near the bottom thereof, an electromagnetic vibrator having a vibratable plate, a color concentrate delivery hopper mounted on said plate and having an upper open end surrounding the bottom of said storage hopper and defined in part by an inclined wall, said storage hopper opening facing toward said wall so that



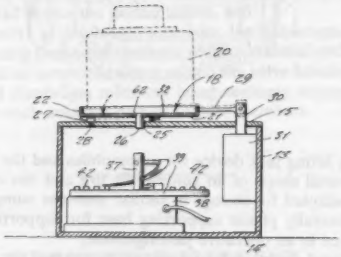
said wall receives the color concentrate from said storage hopper, means to swing said storage hopper to move said opening therein toward and away from said wall to control flow into said delivery hopper, a delivery conduit connected to said delivery hopper for vibrating therewith and having its delivery end extending laterally into said throat, and means for accurately controlling the voltage supply to the vibrator to regulate the amplitude of the vibrator.

4,021,023

AUTOMATIC AGITATOR FOR FILM DEVELOPMENT

Joseph A. Berg, 41 A Troy Drive, Springfield, N.J. 07081

Filed Sept. 29, 1975, Ser. No. 617,937
Int. Cl.² B01F *11/00*
U.S. Cl. 259—73 **2 Claims**



1. An automatic agitator for agitating a film developing tank for film development, comprising: a main housing having four side walls, a bottom portion, and a top removable cover portion: a developing tank support plate for supporting said developing tank thereon; means for pivotally mounting said support plate to said top cover portion; means connected to said support plate for oscillating said support plate and developing tank thereon; limit means mounted on said top cover portion near one end of said support plate for limiting the downward movement of said one end; and control means for controlling the movement of said means for oscillating said support plate; said means for oscillating said support plate comprising a solenoid mounted in one of said side walls, and an arm connected to said solenoid and the other end of said support plate; said means for pivotally mounting said support plate to said top cover portion comprising a pivot bar secured to said top cover portion remote from the central diameter thereof toward said other end of said support plate, a positioning pin secured to said top cover portion, said support plate

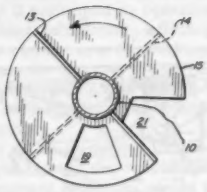
having a central opening to receive said positioning pin with sufficient clearance so that said support plate may freely pivot when acted upon by the force supplied by said solenoid and gravity; said control means comprising a motor, a housing for said motor, a stationary plate mounted above said housing, said stationary plate having a plurality of contacts thereon, and rotating contact means mounted above said stationary plate for intermittently contacting said plurality of contacts to actuate said solenoid to agitate the film developing tank, said rotating contact means comprising a rotatable shaft mounted in said stationary plate, a first arm extending radially from said rotatable shaft, and a second arm connected to said first arm having a contact at the end thereof for contacting said plurality of contacts, said plurality of contacts comprising a first set of contacts and a second set of contacts, said first and second sets of contacts being spaced circumferentially from each other on said stationary plate, said control means further comprising a first switch and a second switch, said first switch connected between said motor and a conventional power source, and said second switch being connected between said first set of contacts and said second set of contacts, said first and second sets of contacts being electrically connected to said solenoid, whereby opening said second switch will deactivate said second set of contacts, said rotating contact means being electrically connected in series with said solenoid and a conventional power source.

4,021,024

PERFORATED BAFFLE-IMPELLER AND PROCESS OF CONCENTRATING DENSE MASSES

Michael A. Stasi, Chicago, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 12, 1976, Ser. No. 675,734
Int. Cl.² B01F 7/02, 7/00
U.S. Cl. 259—109 **16 Claims**



1. A process for concentrating dense masses contained in solid particulate matter within a substantially circular cross-section, stirred, horizontal vessel comprising:

a. rotating a centrally located drive shaft passing longitudinally through said vessel to which are attached

i. a plurality of impellors, which impellors cause essentially no forward or backward movement of said particulate, the paddles of said impellors extending transversely within and to a short distance from the internal surfaces of said vessel, and

ii. at least one baffle, each baffle essentially filling the cross-sectional area of said vessel and having at least two openings, one of said openings at the periphery of said baffle and another interior to said periphery;

wherein said baffle has one backwardly and one forwardly located impellor having one or more paddles each closely spaced in respect of and rotating with said baffle, said backwardly located impellor so disposed in respect of said peripheral opening that dense masses engaged by said impellor tend to move through said peripheral opening only in the forward direction and said forwardly located impellor so disposed in respect of said interior opening that dense masses engaged by said impellor tend not to move through said interior opening in the backward direction; and

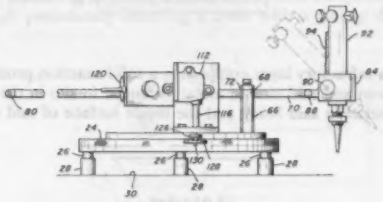
b. removing said masses towards one end of said vessel.

4,021,025

CIRCLE CUTTER

Ronald A. Frame, 816 W. Hartford Place, Broken Arrow, Okla. 74012

Filed May 8, 1975, Ser. No. 576,012
Int. Cl.² B23K 7/10
U.S. Cl. 266—58 **5 Claims**



1. A circle cutting apparatus for cutting circles in metal plates and the like comprising;

a platform having a circular track means secured thereto, means for attaching the platform to the plate to be cut, track follower means movably secured to the track means and capable of being moved completely around said track means, first bracket means attached to the track follower means, an elongated bar longitudinally, slidably attached to the first bracket means and being positioned perpendicular to the axis of the circular track means, cutting apparatus attachable to either end of the elongated bar and operably engageable with the plate to be cut, second bracket means attached to the track follower means, drive means mounted on said second bracket means operably connectable with the platform for moving said track follower means around the circular track means, wherein the drive means comprises a drive motor, a gear reduction means operably connected to the motor and having an output rotating shaft, a drive wheel connected to the rotating shaft for rotation therewith and engageable with the platform for effecting movement of the track follower means with respect to the platform, wherein the drive wheel means comprises a first large wheel connected to the shaft, a second smaller wheel also connected to the shaft and spaced from the large wheel, and wherein said second bracket means is radially adjustable with respect to the track follower means whereby said bracket may be selectively adjusted to place either the large or small wheel into frictional contact with the platform.

4,021,026

PROTECTION FOR EXTERNALLY HEATED CAST IRON VESSEL USED TO CONTAIN A REACTIVE MOLTEN METAL

Andrew Geza Szekely, Yorktown Heights, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

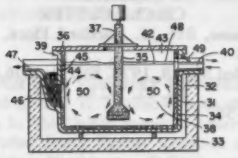
Division of Ser. No. 536,954, Dec. 23, 1974, Pat. No. 3,980,742, which is a continuation-in-part of Ser. No. 323,785, Jan. 15, 1973, Pat. No. 3,870,511, which is a division of Ser. No. 211,950, Dec. 27, 1971, Pat. No. 3,743,263. This application June 4, 1976, Ser. No. 692,901
Int. Cl.² C22B 9/02
U.S. Cl. 266—275 **5 Claims**

1. An externally heated vessel for containing reactive molten metal comprising in combination:

a. a shell of cast iron, provided with

b. a lining comprised of a plurality of self-supporting, refractory plates on the inside surface of said shell which are inert with respect to said molten metal, said plates being free to move along their joints relative to each other, as

well as relative to the inner surface of said shell, upon thermal expansion of said vessel, and



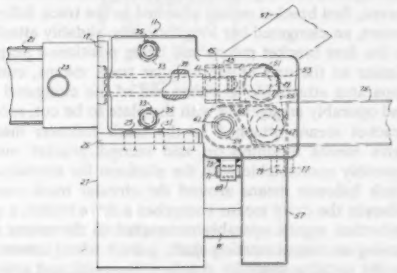
c. a refractory layer comprising a solid reaction product of iron and said molten metal produced in situ in the space between said lining and the inside surface of said shell.

4,021,027

POWER WEDGE CLAMP WITH GUIDED ARM

Leland F. Blatt, 31915 Grooseeck Highway, Frasier, Grosse Pointe Shores, Mich. 48026

Filed May 17, 1976, Ser. No. 687,105
Int. Cl.² B23Q *3/08*; B25B *1/14*
U.S. Cl. 269—32 **1 Claim**



1. In a fluid power operated clamp including a cylinder having a reciprocal piston and connected piston rod projecting from said cylinder, a bifurcated housing axially aligned with and connected to said cylinder and mountable upon a support, said housing being open at its top, bottom, and front, and including a pair of opposed spaced body plates with their ends outturned and secured to said cylinder, said piston rod extending into said housing between said body plates, a pivot bolt extending between forward portions of said body plates and secured thereto, a clamp arm at one end pivotally mounted on said pivot bolt, and in one position, adapted to retainingly engage a workpiece relative to said support, a pair of links at their one ends bearing against opposite sides of said clamp arm and pivotally connected thereto;

the improvement comprising:

a rod end coaxial to said piston rod interposed between and guidably bearing against said body plates, and axially connected to said piston rod for reciprocal movements therewith;

forward portions of said rod end being machined providing an extension of reduced width; the other ends of said links bearing against opposite sides of said extension;

a pressure pivot pin extending through said links other ends and rod end extension; there being an opposed pair of elongated internal slots along the length of said body plates;

the free ends of said pressure pivot pin being flattened upon its top and bottom for sliding non-rotative movement within and along said internal slots;

portions of said clamp arm intermediate its ends being machined providing a section of reduced width; the said one ends of said links bearing against said section of reduced width;

a pair of spaced tubular spacers interposed between and engaging rearward portions of said body plates;

fasteners extending through said spacers and body plates and secured thereto;

a spacer interposed between and bearing against forward and interior portions of said body plates, extending through said one ends of said links and through said clamp arm;

the opposed sides of said clamp arm cooperatively and guidably bearing against interior portions of said body plates during movements between workpiece clamping and release positions;

a pre-stop block spanning and secured to portions of said body plates and spaced from said clamp arm;

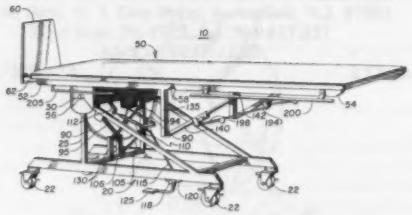
and an adjustable set screw threaded through said block adapted for pressure engagement with the clamp arm when in workpiece-retaining position; said set screw providing sufficient pressure on the clamp arm in its closed or securing position to remove all slop (due to manufacturing tolerences) from said clamp.

4,021,028

TILTABLE TREATMENT TABLE

Albert J. Weber; Frank H. Erling, and Clair A. Bearfield, all of Valley City, N. Dak., assignors to Tri W-G, Inc., Valley City, N. Dak.

Filed Mar. 29, 1976, Ser. No. 671,071
Int. Cl.² A61G *13/00*
U.S. Cl. 269—325 **13 Claims**

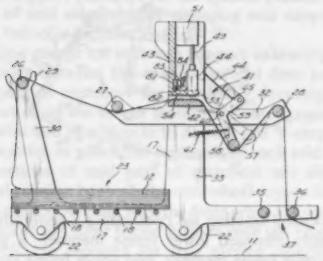


1. A tiltable treatment table comprising, a ground engaging support having an upstanding support frame; pivot means positioned at the top of the support frame; a flat table member pivotally mounted on the pivot means to pivot the table member on the upstanding support frame; torsion spring means associated with the pivot means and adapted to bias the table to a position normal to the ground engaging support; adjustable means included in part in the table means and in part in the support frame to hold the table in varying angular positions with respect to the upstanding support frame; said table member having main and second portion coupled together through a pivot means for pivoting the second portion on the main portion; an adjustable brace means coupled between the main and the second portions of the table member to adjustably position the portions and hold the main and second portions of the table member in a desired angular relationship to one another; said adjustable brace means including a pair of telescopic struts with the outer strut having a pivoted lever mounted and carrying a pin which pin is adapted to project through an aperture in the outer strut and frictionally engage the surface of the inner strut; and an eccentric cam forming a part of said adjustable brace mounted on the outer strut and contacting the pivot lever at the free extremity to move the pin toward and away from the inner strut.

4,021,029
SHADE MARKING MACHINE

George A. Rice, Palestine, Tex., assignor to Work Wear Corporation, Cleveland, Ohio

Division of Ser. No. 451,296, March 14, 1974, Pat. No. 3,951,397. This application Sept. 26, 1975, Ser. No. 617,040
Int. Cl.² B65H 29/46
U.S. Cl. 270—31 6 Claims



1. A method of identifying successive layers of a web for shade marking, comprising the steps of defining a work area having two ends, conveying a web supply in a carriage over the work area by manually moving the carriage alternately from one end of the work area to the other, feeding the web along a path including a loop on the carriage in a manner which permits the loop to change in length, stamping a plurality of areas of each layer with a layer identifying image by bringing a marking medium into contact therewith by relative normal imaging movement between the marking medium and the web, allowing an area of the web being marked to instantaneously stop in its feeding movement along the feed path on the carriage by a change in the length of the loop, whereby said stamping step is performed by operations conducted on said carriage without substantially affecting the forces required to move the carriage over the work area, the web being normally drawn into the loop on the carriage by a tension-biased loop forming member and being positively released with the initiation of imaging movement between the web and the marking medium.

2. A method of shade marking a web to identify pattern pieces of a particular layer of the web, comprising the steps of defining an arrangement of pattern pieces to be cut from a layer of web material, spreading web material in successive layers on a work area by feeding it from a carriage reciprocating over the work area, marking successive layers at points along lines transverse to the web length, the longitudinal location of said lines relative to one another and the defined pattern arrangement being selected to provide at least one mark on each of said pattern pieces, arranging pattern coordinating means along the work area at locations corresponding to said transverse lines, and sensing said coordinating means by means on the carriage to automatically actuate a marking device on the carriage as said carriage passes said coordinating means.

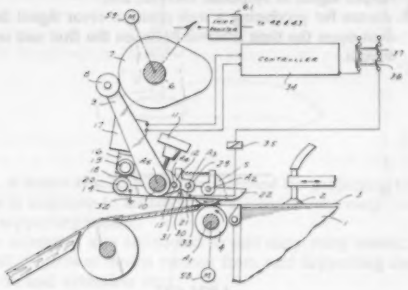
4,021,030
SHEET FEED METHOD AND APPARATUS

Frank Fichte, Taucha, and Wolfgang Paul, Leipzig, both of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed July 2, 1976, Ser. No. 702,274
Claims priority, application Germany, July 15, 1975, 6518729
Int. Cl.² B65H 5/08
U.S. Cl. 271—11 12 Claims

1. A sheet feed apparatus comprising: a fixed roller rotatable about a fixed axis; a support movable toward and away from said fixed roller and having a contact surface; an element having a contact surface and pivotal on said support between a conducting position with said surfaces abutting and a non-conducting position with said surfaces spaced apart; means insulating said contact surface of said element from said support; a movable roller carried on said element and engageable with said fixed roller; and control means connected to said surfaces for varying the position of said support relative to said fixed roller in dependence on the relative positions of said surfaces.

9. A method of adjusting a sheet feed system comprising the steps of: periodically inserting a sheet with a pickup device

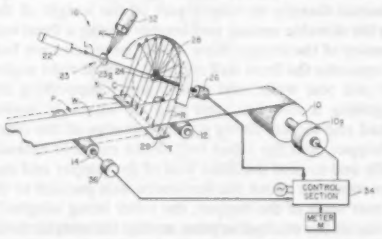


between a pair of rollers and substantially simultaneously releasing said sheet from said device; generating a pickup signal each time a sheet is inserted between said rollers; generating a relatively long release signal each time a sheet is released from said device; generating a relatively short tolerance signal at a predetermined interval after commencement of said release signal but before termination thereof; rotating one of said rollers; moving the other roller from a distant position relatively far from said one roller into a close position closely juxtaposed with said one roller shortly before the instant at which a sheet is inserted between said rollers; and automatically varying the spacing between said rollers in said close position in dependence on said signals.

4,021,031
WEB ALIGNMENT SYSTEM

Edward F. Meihofer, Norfolk, and Tony P. DiGirolamo, Sharon, both of Mass., assignors to Butler Automatic, Inc., Canton, Mass.

Filed Dec. 8, 1975, Ser. No. 638,433
Int. Cl.² B65H 25/26
U.S. Cl. 226—20 6 Claims



1. A system for maintaining lateral alignment of web travelling along a path comprising

A. a light beam source,

B. means for scanning the light beam from the source along a track across the web path so that the beam is intercepted by web only on those portions of the track where web is present, said scanning means including

1. a parabolic reflector positioned opposite the web path,
2. a mirror positioned at the focal point of the reflector and oriented to direct the light beam from the light beam source toward the reflector, and
3. means for rotating the mirror at a constant rate so that the circular sweep of light from the mirror is converted by the reflector to rectilinear light that scans along said track at a constant incident angle

C. means positioned to detect the beam scanning along the track and producing an output signal depending upon the presence or absence of web,

D. means for detecting when the beam scans through a selected position on the track and producing a second output signal in response thereto, and

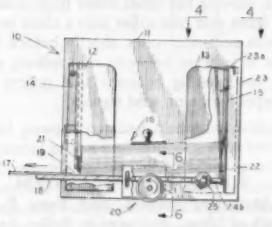
E. means for producing a web position error signal dependent upon the time interval between the first and second signals.

4,021,032

FEEDING DEVICE

Joseph Gross, Plainview, and Stanley Stankowski, E. Northport, both of N.Y., assignors to Computer Terminal Systems, Inc., Plainview, N.Y.

Filed Mar. 12, 1976, Ser. No. 666,363
Int. Cl.² B65H 1/06
U.S. Cl. 271—166 **4 Claims**



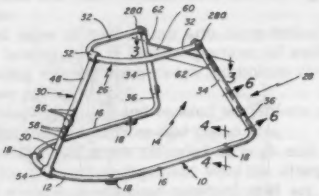
1. A device for individually feeding a plurality of stacked flat articles comprising a hopper for retaining the cards in an upright stack with the bottom card resting partly on drivable means and means partly supporting the stack at an angle to the horizontal thereby to relieve part of the weight of the stack from the drivable means, said hopper having a front wall at the extremity of the hopper from which the articles are fed, a rear wall opposite the front wall and side walls at right angles to the front and rear walls, said means partly supporting the stack comprising a member, one end of which is hooked, the hooked end loosely fitting on the top edge of the rear wall of the hopper, and the other end of the member extending upwardly and toward the front wall of the hopper and carrying a roller rotatable about the horizontal axis parallel to the front and rear walls of the hopper, the roller being adapted to hold the rear of the stack of articles so that the articles in the stack are tilted toward the front wall of the hopper and said hooked end of said member being restrained by the stacked articles from moving toward the front wall of the hopper when the hopper is full and said hooked end of said member moving toward the front wall of the hopper and thereby lowering the roller as the hopper empties, the roller thereby bearing a lesser and lesser proportion of the weight of the stack as the stack is depleted by feeding of the articles from the hopper.

4,021,033

SKATING AID

Roland G. Auclair, 339 West St., High Park, Mass. 02136, and Roland A. Auclair, 1514 Beacon St., Brookline, Mass. 02146

Filed May 27, 1975, Ser. No. 580,668
Int. Cl.² A63C 3/04
U.S. Cl. 272—70.3 **5 Claims**



1. A skating training aid comprising a generally U-shaped, horizontally disposed lower frame member, a generally U-shaped upper frame member, said upper frame member being attached to said lower frame substantially parallel and spaced therefrom, the open end portion of said frame members being a rearward portion of said training aid and the bight portion of said frame members being a forward portion of the training aid, said upper frame member serving as a hand rail for a user of the training aid,

a forward post pivotally connected to both the front of the upper frame member and to the front of the lower frame member,

a pair of rear posts connecting the rearward portion of the side members of the upper frame member to the rearward portion of the lower frame member,

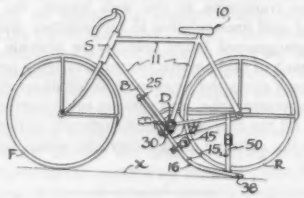
and means for moving the rear posts relative to the upper and lower frame members whereby the upper and lower frame members may be collapsed into a common plane by virtue of their pivotal connections with the forward post.

4,021,034

STAND FOR CONVERTING CONVENTIONAL BICYCLE FOR INDOOR EXERCISING

Karl Richard Olesen, 15245 Hume Drive, Saratoga, Calif. 95070

Filed Sept. 4, 1975, Ser. No. 610,158
Int. Cl.² A63B 69/16
U.S. Cl. 272—73 **10 Claims**



1. For converting a conventional bicycle of the type having a frame including a drive hub from which a rear wheel supporting fork extends rearwardly and a diagonal brace extends forwardly to a steering post for the front wheel supporting fork, a stand for supporting such a bicycle and a person seated thereon comprising:

1. a main body including a pair of members each having a fore portion adapted to be disposed in parallel relation with each other and an aft portion adapted to extend rearwardly therefrom at an obtuse angle relative to its respective fore portion;

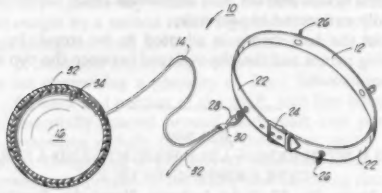
2. means for securing the fore portions of said pair of members in spaced parallel relation to provide a guideway therebetween and a Y-shaped frame in which the angularly disposed aft portions extend rearwardly therefrom as a pair of diverging leg members having foot ends;
3. a hook shaped member secured to the fore ends of the fore portions of said pair of members above the parallel plane thereof for engaging the diagonal brace of a bicycle;
4. a hub support mounted on the spaced parallel fore portions of said members for engaging and supporting the drive hub of a bicycle; and
5. securing means on said hub support extending into the guideway between the spaced parallel fore portions of said pair of members for releasably securing the hub support along the length thereof and in engagement with the drive hub of a bicycle to dispose the Y-shaped frame in a position in which the foot ends of each said diverging aft portions of said pair of members are disposed in spaced relation beneath the rear wheel supporting fork of a bicycle cooperating with the front wheel of such bicycle to support the latter tripod fashion with the rear wheel of such bicycle elevated for free turning operation by a person seated on the bicycle.

4,021,035

KNEE BALL EXERCISE GAME APPARATUS

Patrick L. O'Hara, San Francisco, Calif., assignor to Fee International, Ltd., Oklahoma City, Okla.

Filed Aug. 1, 1975, Ser. No. 601,185
Int. Cl.² A63B *69/00*
U.S. Cl. 272—78 **1 Claim**



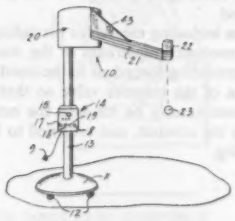
1. A game apparatus which is attachable to the subject user's body to provide exercise and skill usage, comprising in combination:
a single belt disposed only around the subject user's waist and including means for releasably fastening the belt around a user's waist said belt further including a plurality of snap hooks affixed in generally equi-spaced disposition along the entire length for the belt
only one tether cord having a loop means at one end for securement to a selected one of said snap hooks;
adjustable clamping means movably secured on said tethered cord to provide adjustment of said loop thereby altering the length of the tethered cord in accordance with the subject user's desire;
a sphere constructed of resilient material which is secured to the remaining force end of said tethered cord; and
inflatable rubber bladder means disposed within said sphere.

4,021,036

TENNIS TEACHING MACHINE WITH BALL PROJECTOR

David M. Nelson, 939 Rosemary, Deerfield, Ill. 60015; William Stribrsky, 2118 Bristol, Westchester, Ill. 60153, and John A. Britz, 189 Oaksbury Lane, Palatine, Ill. 60067

Filed Dec. 5, 1975, Ser. No. 637,939
Int. Cl.² A63B *69/00*
U.S. Cl. 273—29 A **7 Claims**



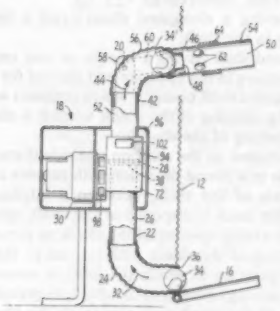
7. A tennis teaching machine adapted for projecting tennis balls in response to an automatic control, comprising:
a supporting means;
an extension arm connected to said supporting means;
ball projection means remote from said supporting means on said extension arm;
control means connected to said ball projection means, said control means having a tapedeck for automatic activation of said ball projection means in coordination with recorded tennis technique instructions wherein a ball hopper connects with said supporting means and said extension arm and wherein said ball hopper has a motor driven rotary ball tray supported therein and a ball position switch on said extension arm for activating said motor driven rotary ball tray.

4,021,037

TENNIS PRACTICE MACHINE

Philip A. Torbet, 97 W. 41st St., San Mateo, Calif. 94403

Filed Apr. 3, 1975, Ser. No. 565,023
Int. Cl.² A63B *39/00*
U.S. Cl. 273—30 **12 Claims**



9. A tennis practice system comprising:
a generally vertical net;
a generally V-shaped return ramp located at the lower extremity of the net so that a tennis ball impacting the net falls onto the return ramp and rolls down the ramp to the base of said ramp;
a conduit having an upstream end located at the base of the return ramp and adapted to receive the tennis ball therefrom and an opposite downstream end located relatively

above the upstream end and adapted to expel the tennis ball;

a passive transfer valve interposed in the conduit intermediate its ends and adapted to normally prevent the passage of air through the transfer valve means toward the upstream end of the conduit, said transfer valve being opened by the impact of the tennis ball to allow passage of the tennis ball through the transfer valve toward the downstream end of the conduit, said transfer valve adapted to close after passage of the tennis ball therethrough; and

air flow means including means for providing suction to the conduit immediately upstream of the transfer valve and means for providing forced air to the conduit immediately downstream of the transfer valve so that a single tennis ball can continuously be hit into the net collected and expelled by the conduit, and returned to the player without reloading.

4,021,038
COMPACT GOLF CLUB ASSEMBLY

Russell W. Kettleson, 17386 Five Points, Detroit, Mich. 48240

Filed Feb. 9, 1976, Ser. No. 656,344
Int. Cl.² A63B *53/02*
U.S. Cl. 273—80.1 **4 Claims**

1. A golf club, comprising:

a head having a elongated shank, and a latch-receiving opening in the shaft;

an elongated shaft having a handle on one end thereof, an axial opening in the opposite end thereof for receiving the shank, and a shaft opening which registers with the latch-receiving opening of the shank when it is disposed in the axial opening of the shaft;

a latch mounted on the shaft on one side thereof so as to be movable in a lateral direction with respect to the longitudinal axis of the shaft, between a latched position in which the latch is disposed in the shaft opening and the latch-receiving opening of the shank to prevent longitudinal motion of the shank with respect to the shaft, and a release position in which the latch is removed from the latchreceiving opening in the shank to permit longitudinal motion of the shank with respect to the shaft;

release means mounted on the shaft on the opposite side thereof as the latch, the release means being movable in a lateral direction with respect to the shaft and being connected to the latch so as to be movable therewith;

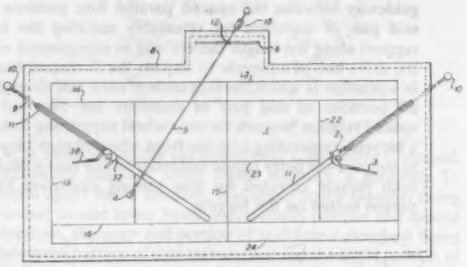
a resilient band embracing the shaft and being so connected to the latch as to bias it toward said latched position whereby the release means are operable to move the latch toward said release position for removing the shank from the axial opening of the shaft; and

the shank having a tapered end for engaging the latch for moving it toward said release position as the shank is being received into the axial opening in the shaft.

4,021,039
MINIATURE SIMULATED TENNIS GAME

Eric Ivan Hay, Teatergatan 6, 1/2 tr, Stockholm, Sweden (111 48)

Filed Apr. 9, 1975, Ser. No. 566,563
Claims priority, application Sweden, Apr. 19, 1974, 7405263
Int. Cl.² A63F *7/06*
U.S. Cl. 273—85 B **15 Claims**



1. A miniature simulated tennis game comprising:

a tennis game court surface divided into at least two sides by boundaries including at least a base line, a service line, a side line and a net means, said net means serving as a boundary for dividing said court into said two sides, said two sides being of approximately equal area;

a hitting means comprising at least one simulated tennis player figure located on each side of said court, each tennis player figure being equipped with a simulated tennis racket;

a manipulating means for manipulating said simulated tennis player figures by hand; and,

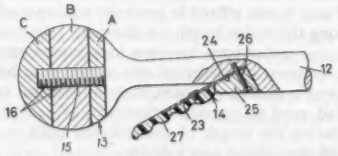
a ball means attached to a rigid arm means, said arm means being attached to a mast which rises above the surface of said court by a coupling means including a bracket rotatably attached to said mast and an axle pivotally connected to said bracket, said arm means being substantially rigidly connected to said axle;

wherein the ball means is adapted to be struck by said hitting means and thereby volleyed between the two sides of said court.

4,021,040
BARBELL WITH REMOVABLE WEIGHTS AND A SPRING TYPE GRIPPING DEVICE

Kenjiro Inoue, No. 52, Naka 4-chome, Nagai-cho, Sumiyoshi, Osaka, Japan

Filed Dec. 12, 1974, Ser. No. 531,852
Claims priority, application Japan, Aug. 2, 1974, 49-93043[U]
Int. Cl.² A63B *13/00*
U.S. Cl. 272—123 **1 Claim**



1. A combination dumbbell and grip exerciser for performing lifting and gripping exercises simultaneously, comprising:

a. an elongated handle with a threaded bar at each end

having a reduced cross-sectional area in the form of a notch toward one end thereof;

b. globular weight means detachably mounted on the bar at each end of the handle for providing resistance to lifting, each of said globular weight means comprising a plurality of units engaging each other in abutting parallel planes, said units when taken together form a sphere, the axis of said sphere coinciding with the longitudinal axis of the handle, each of the units provided with a threaded aperture for securing the units to said threaded bar, the outermost unit to be secured to the threaded bar without the threaded bar penetrating therethrough;

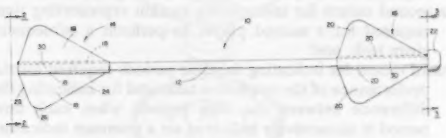
c. a grip force developer mounted in a cantilevered manner within said reduced cross-sectional area of the handle, said developer comprising a detachable plate spring having a finger receiving portion;

d. a holding member engaging a end portion of said detachable plate spring within the reduced cross-sectional area, such that the detachable plate spring is secured between the reduced cross-sectional area of the handle and the holding member.–

4,021,041
THROW AND CATCH TOY

Adolph E. Goldfarb, Tarzana; Erwin Benkoe, Encino; Delmar K. Everitt, Woodland Hills; Ronald F. Chesley, La Crescenta, and Richard D. Frierdich, Canoga Park, all of Calif., assignors to Adolph E. Goldfarb and Erwin Benkoe, both of Northridge, Calif.

Filed Sept. 12, 1975, Ser. No. 612,954
Int. Cl.² A63B *65/00*
U.S. Cl. 273—106.5 R **11 Claims**



1. A projectile toy which may be thrown by a first player and caught by a second receiving player, said toy comprising:

an elongated shaft having a longitudinal axis, a forward end portion and a rearward end portion;

a set comprising a plurality of front fins mounted at the forward end portion of the shaft, said fins being circumferentially spaced around said shaft end portion and extending radially outwardly therefrom; and

a set comprising a plurality of rear fins mounted at the rearward end portion of the shaft, said fins being circumferentially spaced around said shaft end portion and extending radially outwardly therefrom,

said fins being generally disposed in planes that are generally parallel to the longitudinal axis of said shaft,

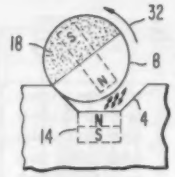
at least the fins of one of said sets each being made of a readily deformable plastic material which tends to retain its deformed shape upon removal of deforming forces such that the fins may be selectively hand shaped by a player so that at least a portion of each such fin spaced radially outwardly from the shaft may be thereby deformed to a plurality of different self-maintaining positions relative to the remaining portion of that fin, with each of said different positions being substantially displaced from the plane of said remaining portion of that fin,

said fins being configured and arranged to stabilize the flight path of the toy when it is thrown in a geneally horizontal path and to cause the toy to glide through at least the latter portion of its flight to facilitate it being caught by the receiving player.

4,021,042
MAGNETIC BOARD GAME

Gerard F. Sweeton, Skillman, N.J., assignor to Vivitronics Corporation, Princeton Junction, N.J.

Filed Oct. 28, 1975, Ser. No. 620,484
Int. Cl.² A63F *3/00*
U.S. Cl. 273—131 AD **5 Claims**



1. A magnetic board game comprising:

a. a game board defining a plurality of pockets arranged in an array formation thereon;

b. a plurality of magnetic bases located adjacent said pockets and positioned within said game board, said magnetic bases giving each pocket a predefined magnetic polarity; and

c. a plurality of spherical magnetic playing pieces including a first side and a second side of oppositely defined polarity, said playing pieces adapted to be selectively positioned within said pockets.

4,021,043
METHOD PROVIDING CHESS APPARATUS

Ronald Ray Lucero, P.O. Box 630, Nyack, N.Y. 10960

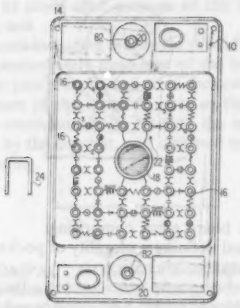
Continuation-in-part of Ser. No. 330,676, Feb. 8, 1973, Pat. No. 3,829,099. This application Aug. 12, 1974, Ser. No. 496,887
The portion of the term of this patent subsequent to Aug. 13, 1991, has been disclaimed.
Int. Cl.² A63F *3/02*
U.S. Cl. 273—131 AB **1 Claim**

1. A method of providing a chess game apparatus comprising making first and second half-sets, including at least one King half-set which comprises four Pawns, a Bishop, Knight and Rook and at least one Queen half-set which comprises four Pawns, a Bishop, Knight and Rook, distinguishable and combining the thus provided first and second half-sets to form one or more team-sets.

4,021,044
ELECTRICAL CIRCUIT BOARD GAME

Teruo Matsumoto, Tokyo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan

Filed Apr. 1, 1976, Ser. No. 672,776
Claims priority, application Japan, Aug. 15, 1975, 50-99304
Int. Cl.² A63F 3/00
U.S. Cl. 273—135 A 4 Claims

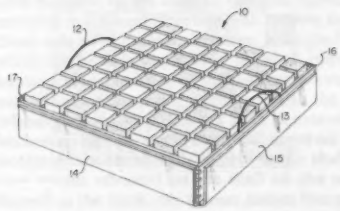


1. An electrical circuit board game, comprising a casing, a playing surface provided on said casing, a plurality of openings within said playing surface, said openings being spaced apart from each other uniform distances and arranged in a predetermined pattern, indicia on said surface connecting adjacent of said openings, a supporting surface within said casing positioned below said playing surface, a plurality of separated, electrically conductive strips, means mounting said strips on said supporting surface such that a portion of one of said strips is positioned directly below each of said openings in said playing surface, said strips being arranged such that the path between adjacent of certain of said openings defines a potential connection between said adjacent strips, an electrical signal, a source of electrical energy, means connecting said signal and source of energy to certain of said plurality of conductive strips, and a plurality of electrically conductive playing pieces provided with arms spaced apart a distance corresponding to the distance said openings are spaced apart from each other to be positioned within adjacent of said openings selected by the player.

4,021,045
GAME PIECE RETAINING

Seymour Mermelstein, 223 Park St., Newton, Mass. 02158

Filed May 10, 1976, Ser. No. 684,658
Int. Cl.² A63F 3/02
U.S. Cl. 273—136 D 7 Claims

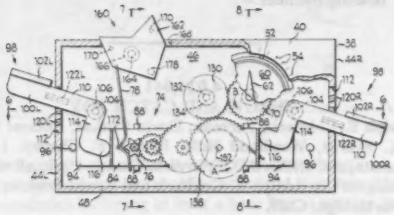


1. Game piece retaining apparatus comprising,
a plurality of blocks each having a top surface for defining a game piece location,
a base,
means for securing said blocks to said base to define a plurality of recesses between adjacent blocks,
a plurality of interconnected slats normally residing in said recesses when a game is being played on said game piece locations,
and means for selectively displacing said interconnected slats from said first-mentioned position in said recesses to a second stable position above said recesses to define a plurality of cells each surrounding a respective region above a game piece location for confining a game piece to a game piece location when said interconnected slats are in the lastmentioned position above said recesses.

4,021,046
ACCUMULATIVE COMPARATIVE TIMING DEVICE

Gordon A. Barlow, Skokie, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Division of Ser. No. 548,203, Feb. 10, 1975, Pat. No. 3,990,698. This application Aug. 16, 1976, Ser. No. 714,617
Int. Cl.² A63D 9/00
U.S. Cl. 273—148 R 14 Claims

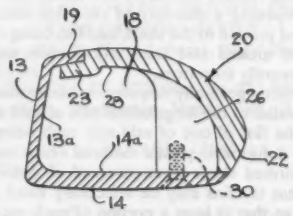


1. A time device, comprising:
a first means for transmitting motion representing time required for the performance of a first given task;
a second means for transmitting motion representing time required for a second player to perform a subsequent given task; and
third means for indicating the time periods required for the performance of the respective tasks and for indicating the difference between the time periods when each time period is successively indicated on a common indicator.

4,021,047
GOLF DRIVER CLUB

Robert J. Mader, 1218 Arlington Ave., Torrance, Calif. 90501

Filed Feb. 25, 1976, Ser. No. 661,324
Int. Cl.² A63B 53/04
U.S. Cl. 273—167 H 6 Claims



1. A head for a golf club comprising:
a one-piece casting comprising sole plate, face plate, toe and heel portions, each of said portions having an inner surface, said four inner surfaces forming a concavity having an open top opposite the inner surface of said sole plate portion and a substantially fully open end opposite the inner surface of said face plate portion, and a ledge portion running along the top edge of said face plate between the toe and heel portions,
a cap having a curved outer top surface and a curved rear

surface which smoothly continue the contours of the casting, a lip portion offset below said top surface and extending outwardly along the side of said cap opposite to that on which said rear surface is located, and an inner surface opposite said top surface, said inner and top surfaces defining the top wall of said cap,

said cap being fitted between the inner surfaces of said casting with the lip portion thereof under and against the inner surface of the ledge portion of the casting to enclose the concavity, the rear surface of said cap covering the substantially fully open end of said casting and the top surface of said cap covering the open top of said casting, thereby forming a hollow chamber in said club head, and

means for firmly securing said cap to said casting.

4,021,048

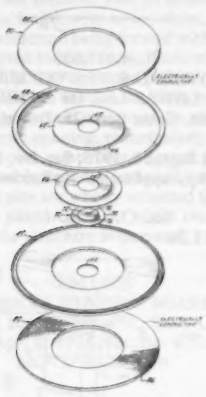
CARRIER ACCESSORY FOR USE WITH RECORD DISCS ON PHONOGRAPHS

Allan R. Fowler, Santa Ana, and Alfred W. Bolls, Foster City, both of Calif., assignors to Duovel Company, Irvine, Calif.

Continuation of Ser. No. 413,785, Nov. 8, 1973, abandoned. This application Feb. 3, 1975, Ser. No. 546,741

Int. Cl.² G11B *3/62*

U.S. Cl. 274—1 R **14 Claims**



1. For use in conjunction with a nominally 12 inch diameter record disc having a central label area surrounded by a recording area which is in turn surrounded by a rim area, a free and separate carrier accessory adapted to underlie, carry and drop to the turntable with the record disc through the changing and playing operation on the spindle of a record changing phonograph, comprising:

a generallly rigid circular disc-like supporting body having an overall diameter substantially equal to or greater than that of the record disc,

the body including an elevated central hub and a substantially flat annular flange surrounding and extending outwardly from the elevated hub, the elevation of the hub being with respect to the flat annular flange,

the elevated hub including a central portion which is exposed on both sides and has a spindle hole therein, and means for supporting said central portion in juxtaposition to an overlying record disc;

a layer of flexible cushioning material in the form of an annulus attached on and protruding from one side of the flange and surrounding the elevated hub for engaging the recording area of an overlying record disc; and,

a layer of flexible cushioning material attached on the opposite side of the flange.

4,021,049

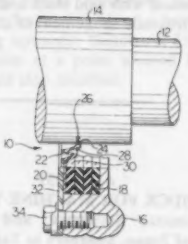
ADJUSTABLE LIP TYPE SEAL FOR A CRANKSHAFT

Elmer B. Phelps, Creve Coeur, and Allen J. Friede, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 15, 1975, Ser. No. 640,512

Int. Cl.² F16J *15/16*

U.S. Cl. 277—11 **10 Claims**



1. A lip seal providing an axially adjustable seal on a running surface of a shaft comprising

a generally ring shaped retainer circumscribing said shaft,

a hollow cylindrical cavity within said retainer,

a generally ring shaped seal mounting member slidably positioned within said cavity,

a lip seal mounted on said seal mounting member in contacting relation with said shaft,

a plurality of separate and distinct ring shaped spacer members in said cavity which are separable so that said seal mounting member may be selectively positioned between different ones of said plurality of spacer members, thereby allowing axial adjustment of the point of engagement of the lip seal with the running surface of the shaft,

a ring shaped spacer retainer retaining said seal mounting member and said spacer members within said cavity, and

mounting means mounting said spacer retainer on said retainer.

4,021,050

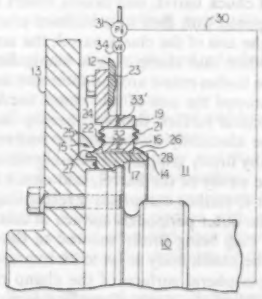
AIR BEARING SEAL WITH BELLOWS MOUNTING MEANS

Harold C. Powers, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 23, 1976, Ser. No. 660,524

Int. Cl.² F16J *15/40*

U.S. Cl. 277—75 **18 Claims**



1. A pressurized sealing arrangement comprising a rotatable shaft, a generally ring shaped bearing member of rigid material positioned about said shaft, said bearing defining an inner surface and having at least one opening therein on said inner surface thereof and wherein said inner surface is spaced from said shaft, said bearing member further defining a pair of rigid,

radially directed side walls, and further including thereon lip seal means of flexible material normally contacting said shaft and movable under air flow into non-contacting relation with said shaft, a flexible boot mounting means fixed to said generally ring-shaped member and having a pair of side walls of flexible material defining an air chamber therebetween, and means for supplying pressurized air to said chamber through said at least one opening and along said shaft to lift said lip seal means out of contact with said shaft and thereby to continuously prevent retrograde movement of contaminants.

4,021,051
CHUCK FOR MACHINE TOOLS

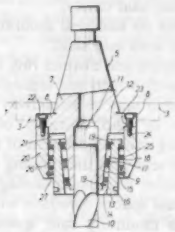
Yoshitaka Toyomoto, Neyagawa, and Noboru Kawasaki, Katano, both of Japan, assignors to Yutaka Seiko Kabushiki Kaisha, Osaka, Japan

Filed Dec. 17, 1975, Ser. No. 641,823

Claims priority, application Japan, Mar. 8, 1975, 50-31631[U]

Int. Cl.² B23B *31/04*

U.S. Cl. 279—1 N **6 Claims**



1. A chuck for machine tools comprising a chuck body consisting of a holder adapted to be set in the chuck receiving port of a machine tool, a chuck barrel extending from and integral with said holder and having an outer peripheral surface tapered in the direction of said extension, said chuck barrel having a tool receiving bore for receiving a tool therein, a clamp ring fitted over the outer peripheral surface of said chuck barrel and adapted to be manipulated for rotation; rollable bodies consisting of a group of needle rollers interposed between said clamp ring and the outer peripheral surface of said chuck barrel, said needle rollers being circumferentially disposed with their axes inclined at a fixed angle with respect to the axis of the chuck barrel; the arrangement being such that when said clamp ring is manipulated for rotation, said rollable bodies rotate around their own axes while spirally revolving around the axis of said chuck barrel on the conical outer peripheral surface thereof, thereby causing the chuck barrel to be elastically contracted or restored to its original state, thereby firmly gripping or relasing the shank of the tool fitted in the cavity of the barrel, said chuck being characterized in that it further comprises a restraining ring shaped to surround the outer peripheral surface of said clamp ring, said restraining ring being firmly secured to the base and of the holder of the chuck body so as to circumferentially surround the outer peripheral surface of the clamp ring, and rollable bodies consisting of a group of needle rollers circumferentially arranged between the inner peripheral surface of the restraining ring and the outer peripheral surface of the clamp ring, the arrangement being such that the radially outwardly directed expansive deformation of the clamp ring under the reaction of the chuck barrel, when the latter is elastically contracted in order to grip the tool, is shared and restrained by said restraining ring.

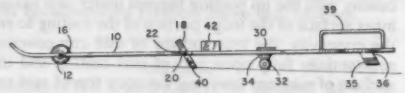
4,021,052
LAND SKI APPARATUS

Lloyd C. Knowles, 43 Front St., Hopkinton, Mass. 01748

Filed Apr. 21, 1976, Ser. No. 678,865

Int. Cl.² A63C *17/14, 17/04*

U.S. Cl. 280—11.2 **12 Claims**



1. A land ski device comprising:
- a pair of ski members each having a front, central, and rear portion;
- a front wheel journaled to the front portion of each of said ski members;
- a reverse braking member pivotally attached in an aperture defined within the central portion of said ski member;
- means for releasably attaching a user's ski boot to the upper central portion of each of said ski members;
- a support member affixed to the central bottom portion of each of said ski members;
- a rear wheel journaled to said support member; and
- a rear stationary braking member affixed to the bottom rear portion of each of said ski members.

4,021,053
DEVICE PROVIDING IMPROVED SUPPORT OF THE LOWER LEG OF A SKIER

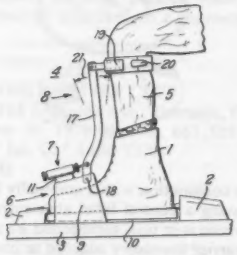
Hans Anton Willi, Gassa Suro 25, Domat, Ems, Switzerland (7013)

Filed Sept. 30, 1975, Ser. No. 618,251

Claims priority, application Switzerland, Oct. 1, 1974, 13232/74

Int. Cl.² A63C *11/00*

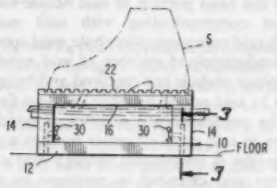
U.S. Cl. 280—11.36 **6 Claims**



1. A leg support device for improved supporting of the lower leg of a skier on a ski and comprising:
- connectable lower support means for rigidly connecting said device to the ski in the plane of the ski;
- at least one elongated pivot arm;
- means for pivotably connecting one end of said pivot arm to said lower support means such that the pivotable connection is located approximately at the height of the ankle joint of the skier;
- an upper support means for grasping around at least a part of the lower leg, the other end of said pivot arm being connected to said upper support means and said pivot arm and said lower support means having a length such that said upper support means can grasp around the lower leg in the calf regionthereof; and
- at least one double action resilient means connected on the one hand to the pivot arm and on the other hand to another part of the leg support device for resiliently bias-

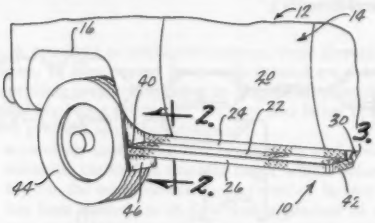
ing said pivot arm back to a neutral position from pivotal movements toward either side of said neutral position.

4,021,054
ACCESSORIES AND AIDS FOR USE BY ICE SKATERS
Frank Csutor, 408 Jefferson Ave., Bristol, Pa. 19007
Filed Apr. 14, 1975, Ser. No. 567,588
Int. Cl.² A63C *3/00*
U.S. Cl. 280—11.37 R **4 Claims**



1. A device for use by an ice skater comprising means affording a flat surface adapted for supporting the boot of an ice skate, said surface being interrupted by an elongated slot extending generally centrally thereof to receive the blade of said ice skate, said means comprising a rectangular structure having a flat top surface padded for protectively cushioning a skate boot supported thereon, said structure being substantially coextensive in length with an ice skate, said top surface of the rectangular structure being formed with a longitudinally extending slot adapted to receive the blade of an ice skate the boot of which is supported upon the padded top surface, said slot being proportioned to receive the blade with the blade out of contact with the sides and bottom of the slot, said structure including downwardly opening, rectangularly spaced recesses in its bottom, and pins removably engaged in said recesses, said pins being movable between two positions in the recesses, in one of which the pins are wholly retracted therein and in the other of which the pins project out of the recesses to grip the surface on which the structure is disposed.

4,021,055
VEHICLE RUNNING BOARD
Merlyn C. Okland, 204 W. Broad St., Story City, Iowa 50248
Filed Apr. 8, 1976, Ser. No. 675,155
Int. Cl.² B62B *9/16*
U.S. Cl. 280—153 R **2 Claims**



1. A running board for use in combination with a vehicle having a cab mounted on a vehicle frame, front and rear wheels supporting said frame, said cab having a front wheel opening and a horizontally disposed lower portion extending rearwardly from said wheel opening, said running board comprising:

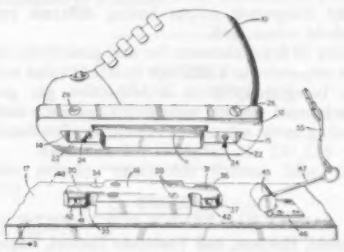
an elongated step member having in cross section a vertically disposed support portion, a horizontally disposed step portion extending outwardly from the lower end of said support portion, and a downwardly disposed outer end portion extending downwardly from the outer end of said step portion;

said support portion having means for securing its uppper edge to said horizontally disposed lower portion of said cab;

a plurality of elongated rigid reinforcing members being secured to the underside of said step portion and extending transversely thereof to terminate at inner ends located inwardly from said step member,

a plurality of elongated braces each secured at its lower end to corresponding one of said inner ends of said reinforcing members by means permitting adjustable pivotal movement during mounting about a horizontal axis, said brace extending upwardly therefrom for securement to said vehicle frame at a point located inwardly of said upper end of said step member.

4,021,056
SKI BOOT WITH SOLE CAVITY BINDING
Gilbert B. Oakes, Sugar Hill, N.H., assignor to Gilbert B. Oakes; James R. Branch, both of Sugar Hill and Roger A. Peabody, Franconia, all of, N.H., part interest to each
Filed Apr. 26, 1976, Ser. No. 680,093
Int. Cl.² A63C *9/08*
U.S. Cl. 280—613 **10 Claims**



1. A cavity-sole ski boot and mating ski-attachable block comprising:

a. a ski boot;

b. a sole with a central longitudinal cavity attached to said ski boot;

c. a block mating with said cavity and attachable to a ski, said block comprising:

1. a central rectangular portion;
2. a longitudinally extending forward end having left and right sides and a blunt termination;
3. a longitudinally extending after end having left and right sides and a rear blunt termination;
4. two vertical half-round grooves proximate the juncture of said central rectangular portion with each of said forward end and said after end, one groove being on the left side and one on the right side of the respective end; and
5. a longitudinal half-round groove along each of the left and right sides of each of said forward end and said after end, each groove containing a detent stop;

d. four detents, two of which are located near the forward end of said sole and operate laterally into said cavity and two of which are located toward the after end of said sole and operate laterally into said cavity, whereby said ski boot may be locked to said block by detent action.

4,021,057
SAFETY ARRANGEMENT FOR PASSENGERS OF A VEHICLE

Manfred Held, Aresing, and Johann Spies, Pfaffenhofen, both of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Oct. 14, 1975, Ser. No. 621,765

Claims priority, application Germany, Oct. 23, 1974, 2450235

Int. Cl.² B60R *21/08*

U.S. Cl. 280—735 **6 Claims**

1. A safety arrangement for passengers in a moving vehicle comprising:
- an inflatable air cushion for maintaining passengers in their seat positions;
- a plurality of gas generators for inflating said cushion;
- piezoelectric sensor means mounted on said vehicle for providing an electrical analog signal representative of deceleration of the vehicle;
- an integrator responsive to said deceleration-representative electrical signal;
- a plurality of threshold value electrical switches responsive to the integration output having different respective threshold values; and
- a plurality of firing elements for said generators, each element responsive to a different threshold value switch and each being coupled to a respective gas generator; whereby said cushion will be inflated at a rate corresponding to the amount of vehicle deceleration.

4,021,058
SAFETY BAG DEVICE FOR VEHICLE

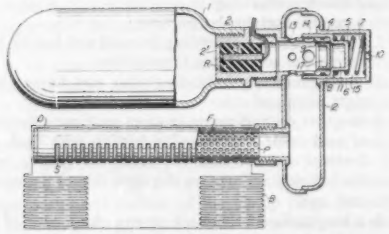
Mikio Suzuki, Hekinan, and Yoshiyuki Hattori, Nagoya, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Oct. 28, 1975, Ser. No. 626,565

Claims priority, application Japan, Oct. 30, 1974, 49-125740

Int. Cl.² B60R *21/08*

U.S. Cl. 280—737 **4 Claims**



1. In a safety bag device for use in a vehicle and of the type comprising an inflatable safety bag, a high pressure gas source, a conduit for leading the gas discharged from said gas source into said bag, and rupture plate means interposed between said gas source and said conduit for normally interrupting the communication between said gas source and said conduit unless said rupture plate means is ruptured in case of a collision of the vehicle, the improvement comprising:
- a nozzle member interposed between said rupture plate means and said conduit and having a nozzle chamber and a plurality of nozzle holes opening into said conduit from said nozzle chamber for conducting gas from said source to said conduit following rupture of said rupture plate means, said nozzle member also having a head portion and at least one communication hole formed in said head portion and opening into said nozzle chamber;
- spool means fitted to said nozzle member so as to define outside the head portion of said nozzle member a spool chamber communicating with said nozzle chamber through said communication hole, said spool means closing a predetermined number of said nozzle holes when said rupture plate is not ruptured and being slidable with respect to said nozzle member and in a first direction to open the predetermined number of nozzle holes when pressure in said spool chamber reaches a predetermined value as gas is introduced through said communication hole into said chamber in response to an increase in pressure in said nozzle chamber as a result of the rupture of said rupture plate means;
- guide means attached to said conduit for guiding sliding movement of said spool means; and
- a bias spring disposed between said spool means and said guide means for urging said spool in a direction opposite to said first direction, whereby the flow rate of the high pressure gas into said safety bag may be controlled to be low at the intitial stage and higher thereafter.

4,021,059
PRODUCTION OF IMAGES

James Kenneth Skelly, Wilmslow, England, and Michael Farrington, Spartan, South Africa, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

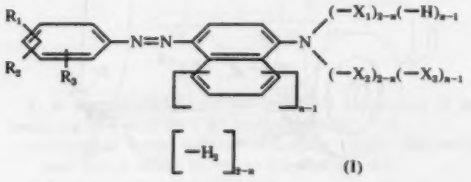
Filed Apr. 23, 1975, Ser. No. 571,035

Claims priority, application United Kingdom, Apr. 25, 1974, 18200/74

Int. Cl.² B41M *5/22*

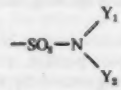
U.S. Cl. 282—27.5 **23 Claims**

1. An image producing system which comprises a carrier material of fabric, paper, a felt or fabric pad impregnated with a colour former solution, comprising a weakly volatile high boiling organic solvent having a boiling point of at least 150° C and having dissolved therein a color former and as a colour former de-activating substance a non-volatile liquid alkanol amine, wherein the color former is an azo compound having the general formula I:



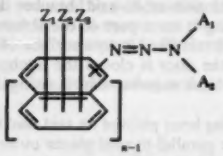
(I)

in which R_1, R_2 and R_3 each represents hydrogen, halogen, alkyl, alkoxy, aryloxy, alkoxycarbonyl, dialkylaminocarbonyl, acylamino, acyl(alkyl)amino,



in which Y_1 and Y_2 each represents alkyl or aryl, or in which Y_1 and Y_2 together represent an alkylene group; X_1 is hydrogen or an alkyl group, X_2 is an alkyl, cyanoalkyl or arylmethy-

lene group or X_1 and X_2 together represent an alkylene group, X_3 is an alkyl or aryl group and n is 1 or 2, preferably 1, or of the general formula II:



(II)

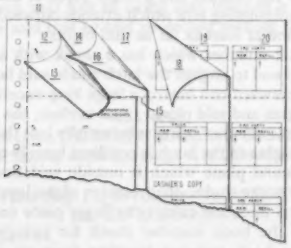
in which Z_1, Z_2 and Z_3 each represents hydrogen, alkyl, substituted alkyl, alkoxy, halogen, nitro, acylamino, aminoacyl or alkoxycarbonyl, A_1 and A_2 each represents alkyl or phenyl or A_1 and A_2 together with the nitrogen atom to which they are bound form a heterocyclic ring system and n is 1 or 2; and a substrate which has incorporated therein or possesses at least one surface which is at least partially coated with a colour former activating substance or system and a re-activating organic acid which counteracts the de-activating substance and in which, when the color former corresponds to formula II, the color activating substance is present in admixture with an azo coupling component.

4,021,060

MULTIPART BUSINESS FORM OR MANIFOLD HAVING STRIPPABLE LABEL

Dunham Briggs Seeley, Fairport, and David Robert Hassel, Rochester, both of N.Y., assignors to Burroughs Corporation, Detroit, Mich.

Filed Sept. 8, 1975, Ser. No. 611,257
Int. Cl.² B41L *1/16*
U.S. Cl. 282—28 R **6 Claims**



1. A manifold or multipart business form formed from an assembly of plys coated from rolls printed on a continuous web printing press, comprising an original label stock ply, said original ply being printed on the face and being undercoated with a pressure sensitive adhesive.

a second ply underlying said original ply and consisting of unsealed carbonless transfer paper which before assembly into the manifold has been printed on its face and then has been coated on its face with a precoat of vegetable wax, and a third ply underlying said second ply which has been preprinted on its face and consists of a carbonless transfer paper.

4,021,061

SELF-LOCKING COUPLING

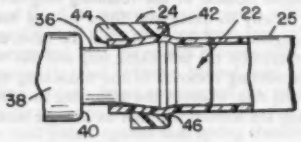
Harry M. Zimmerman, Coronado, Calif., assignor to Reed Irrigation Systems, Inc., El Cajon, Calif.

Filed Apr. 10, 1975, Ser. No. 566,689
Int. Cl.² F16L *55/00*
U.S. Cl. 285—13 **6 Claims**

1. A coupling device for providing a fluid tight connection with a flexible conduit comprising:

a male member having a cylindrical body portion integral with an enlarged circumferential portion near one end, said enlarged portion having an inner conical surface that diverges toward said one end, a relatively narrow and generally cylindrical surface adjacent said inner conical surface which is only slightly larger in diameter than the conduit to be coupled, and an outer conical surface that converges from said cylindrical surface toward the end of said male member, said male member also including an additional cylindrical tubular portion extending axially from the smaller end of said outer conical surface;

means attached to the other end of said body portion forming a shoulder substantially transverse to the axis of said male member;



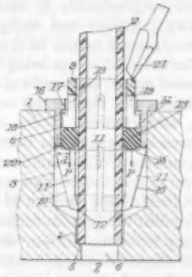
a female member attached to and movable on said male member, said female member having an annular sleeve portion with a conical inner surface that diverges from an inner to an outer edge and a plurality of circumferentially spaced apart arms projecting substantially parallel to the axis of said sleeve portion from its said inner edge, said female member having means extending inwardly to a smaller diameter than said enlarged portion of said male member so that it will be retained on and not separated from said male member when not in use as well as when connected to a conduit.

4,021,062

COUPLING ASSEMBLIES

Claude Mariaulle, Le Palais sur Vienne, France, assignor to Automatisation-Sogemo, Saint Junien, France

Filed Feb. 19, 1975, Ser. No. 551,115
Claims priority, application France, Mar. 15, 1974, 74.08914
Int. Cl.² F16L *17/02*
U.S. Cl. 285—39 **17 Claims**



1. A coupling assembly for connecting a tube to a member having a bore and an opening into the bore through which the tube is to be inserted, comprising:

a retaining ring, the outside diameter of at least a major portion of which is smaller than said opening such that the retaining ring is insertable through said opening into the bore said retaining ring being one integral piece which includes an elongated first portion which is adapted to be fixed to the bore and, a plurality of axially elongated gripping teeth formed as extensions from said elongated first portion of the retaining ring extending farther into

the bore and radially, inwardly, said teeth including sharp ends for biting into a tube extending through the retaining ring and said teeth being naturally biased resiliently radially inwardly by an amount sufficient to exert a holding force on the tube opposing movement of the tube out of said opening,

and an unlocking ring located radially inwardly of the retaining ring in an annular interval formed between the retaining ring and a tube extending therethrough, said unlocking ring being movable axially in said interval to exert a force against the teeth to spread said teeth to disengage them from the tube, said unlocking ring extending axially, in the direction away from the teeth, beyond the retaining ring, such that the unlocking ring is accessible outside of the retaining ring for moving the same axially to exert said force on the teeth to cause disengagement of the teeth from the tube, and including stop means on the unlocking ring and the retaining ring for preventing removal of the unlocking ring from the retaining ring, whereby the unlocking ring and the retaining ring are formed together as a single assembly.

4,021,063

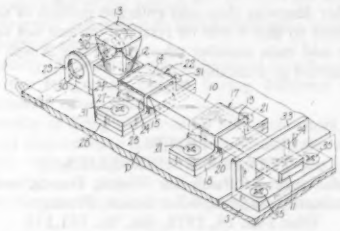
SURFACE BOLT

James T. Porter, Guilford, Conn., assignor to Leigh Products, Inc., Coopersville, Mich.

Filed June 4, 1975, Ser. No. 583,644

Int. Cl.² E05C *1/04, 13/02*

U.S. Cl. 292—67 **1 Claim**



1. A surface bolt assembly comprising, an elongated bolt body having top and bottom surfaces and forward and rearward ends, forward and rearward guides for said body, the body being slidable longitudinally in said guides between locked and unlocked positions and being provided with a recess extending transversely across its top surface adjacent the rearward end thereof, said recess being releasably engageable with the rearward guide, and resilient means within said rearward guide continuously biasing the recess toward guide engaging position, said resilient means comprising a coil spring under compression against the bottom surface of the bolt body and an arcuately profiled saddle element interposed between the coil spring and the bottom surface of said belt, and an arcuately profiled saddle element in said forward guide bearing resiliently against the bottom surface of the bolt, and a member projecting from the bottom surface of said bolt between said guides adapted to contact said rearward guide to prevent withdrawal of the bolt from said guides.

4,021,064

CAM HOOK FOR SNUGGING DOORS

Albert W. Kruzan; Loren P. Boppart, both of Harvard, Ill., and Charles M. Bland, Beloit, Wis., assignors to Chromalloy American Corporation, New York, N.Y.

Filed May 27, 1975, Ser. No. 580,948

Int. Cl.² E05C *5/00, 19/12*

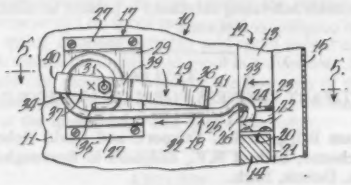
U.S. Cl. 292—111 **14 Claims**

1. Hook means for snugging a door of a structure comprising, in combination:

a fixed latch catch mounted on a door adjacent an upright side thereof;

a hook mounting bracket which has a body with an unobstructed planar outer surface provided with a generally centrally positioned stud, said bracket having flange means mounting it on a part of the structure with said body in spaced relationship to a surface of the structure so that when the door is closed the latch catch may be engaged by a hook member that is swingable about the stud;

a bar-like camming lever pivoted on said stud for movement in a first plane parallel to said planar outer surface, said camming lever having a first arm with a surface which is in immediate juxtaposition to said planar outer surface, said camming lever having two bights of predetermined depth which are effectively segments of a circle struck about a center on the lever that is spaced from the stud, both said bights projecting outwardly from said first plane and having open sides confronting the planar surface of the mounting bracket, one of said bights providing a camming surface, said camming lever also having an



elongated manual manipulating arm that is in said first plane and extends a substantial distance laterally from the body of the bracket and a finger piece at the free end of said manipulating arm which extends outwardly from said first plane at least as far as said bights;

and a hook member which has a shank with a hook at its forward end to engage the latch catch, said hook member at its rearward end having a large loop received between said bights and said planar outer surface, the thickness of said hook member being substantially less than the depth of the bights so the hook is confined loosely to movement in a second plane which is outside said first plane and normal to the stud so that rotation of the lever in a predetermined direction causes the finger piece on the lever to engage the hook member shank for swinging the lever and the hook member together from an idle position toward the latch catch, said center on the lever being so located that after the hook is engaged with the latch catch continued rotation of the camming lever in said predetermined direction causes said camming surface to traverse the loop and move the hook member longitudinally rearwardly to snug the door toward the stud.

4,021,065

ELECTRIC LOCK

Arthur V. Geringer, 5424 Geyser Ave., Tarzana, Calif. 91356

Filed July 8, 1975, Ser. No. 593,966

Int. Cl.² E05C *1/06*

U.S. Cl. 292—144 **16 Claims**

1. An electric lock, comprising:

a. an elongate housing adapted for mounting in a narrow door stile or frame member with the longitudinal axis of the housing being aligned with the longitudinal axis of the member;

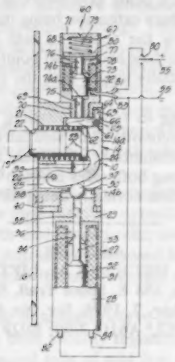
b. a bolt supported in said housing for movement on an axis in right-angled relation to the longitudinal axis of said housing between a projected locking position and a retracted non-locking position;

c. means normally urging said bolt towards its retracted position; and

d. means for actuating said bolt to a projected locking position, which includes:

a solenoid mounted to said housing and having a plunger supported for axial movement on an axis having parallel relation with respect to the longitudinal axis of said housing,

an angle lever in said housing and pivoted at one end for



swinging movement and having an outer end adapted for surface engagement with an inner end surface of said bolt,

a ball member interposed between said solenoid plunger and said angle lever, and means in said housing for guidingly supporting said ball for free movement in a path coaxial with said solenoid plunger,

said axial movement of said solenoid plunger, acting through said ball to swing said lever in a direction to move said bolt to said projected locking position.

4,021,066

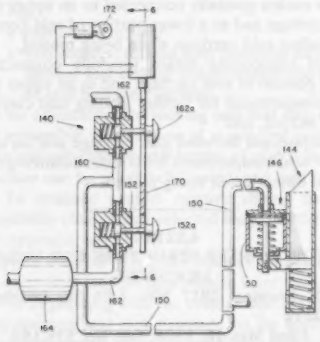
PNEUMATIC DOOR LOCKING SYSTEM

James R. McShane, 4250 Saratoga Ave., Downers Grove, Ill. 60515

Filed July 11, 1975, Ser. No. 595,043

Int. Cl.² E05C *1/00*

U.S. Cl. 292—144 **2 Claims**



1. A pneumatic door locking system which is intended for locking a door of a vehicular carrier intended to transport goods and which is connected to a source of pressurized air utilized by the carrier, said system comprising:

means for latching a door to a door frame of a carrier;

said latching means including a bolt and means for biasing the bolt toward a latched position in which the door is prevented from opening;

said latching means including a box-shaped holder for said bolt, said holder being open at one end and closed at the opposite end with one side of said holder being fixed to the carrier and the opposite side having a slot therein, said bolt and said biasing means being received in said holder with said biasing means disposed between said closed end of said holder and one end of said bolt and said bolt having a slot therein aligned with said slot in said holder;

pneumatically-operated means for urging said bolt to an unlatched position;

said bolt urging means including a cylinder mounted to the opposite side of said holder, a piston in said cylinder, a piston rod fixed at one end to said piston with the other end of said piston rod extending from said cylinder and being connected to a bar which extends into said slots, and a spring in said cylinder behind said piston, said connecting means being connected to said cylinder whereby air pressure is applied to the front of said piston to move said piston against said spring thereby to move said bar in said slot in the said bolt to engage and move said bolt against the biasing means to an unlatched position and whereby when air pressure is vented from said cylinder, said bolt is moved by said biasing means and said spring to a latched position;

means connecting said bolt urging means to a source of pressurized air; and

manually-operated valve means disposed on the exterior of the carrier and coupled to said connecting means for venting said bolt urging means to atmosphere.

4,021,067

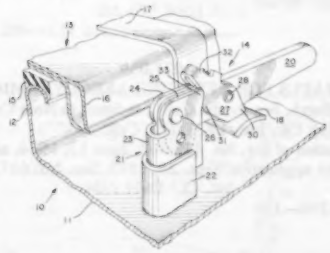
HATCH COVER LOCKING MECHANISM FOR COVERED HOPPER CARS

Rudolph E. Nadherny, Naperville, Ill., assignor to Illinois Railway Equipment Company, Chicago, Ill.

Filed Mar. 15, 1976, Ser. No. 666,597

Int. Cl.² E05C *3/04*

U.S. Cl. 292—256.5 **9 Claims**



1. Lock means for locking down in its closed position over an upstanding hatchway in a roof or deck a hatch cover which is hinged at one side of said hatchway, comprising, a hatch cover press-down member mounted on and projecting laterally from the side of said hatch cover opposite the side thereof which is hinged, said press-down member being spaced above said roof or deck when said hatch cover is closed, an upstanding support for an operating lever mounted on said roof or deck adjacent to one side of said press-down member and having a pawl-engaging formation projecting toward said press-down member, an operating lever pivotally mounted at one end on said support in such manner that in its locked position said lever extends over said press-down member, and a pawl pivotally mounted on said lever and having a foot portion for engaging said press-down member and a latching portion for engaging said pawl-engaging formation, both said foot portion being in press-down engagement with said press-

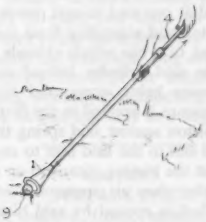
down member and said latching portion being in latched engagement with said pawl-engaging portion when said lock means is in its locked condition.

4,021,068

GOLF BALL RETRIEVERS

Anthony F. Piazza, 1408 Valecroft Ave., Thousand Oaks, Calif. 91361

Filed Feb. 23, 1976, Ser. No. 660,481
Int. Cl.² B66C *1/02*
U.S. Cl. 294—19 A **2 Claims**



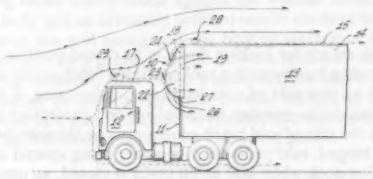
1. In a golf ball retriever containing a vacuum producing means connected by a passage to a receptacle which is of a size, shape and inner texture to accept and releasably retain a golf ball said vacuum producing means serving also as a pressurizing system for freeing a retained golf ball at the convenience of the user and said vacuum producing means being comprised of a tubular handle and a close fitting piston joined to an elongated and slidable rod which is terminated in its upper section in a knob for grasping, an improvement comprising a lower rod section extending from said piston whereby entry of a golf ball into said receptacle induced by the lowering of the receptacle over the ball causes upward sliding of the piston, produces visible movement of said knob and provides a signal of the golf ball's presence in the receptacle, said lower rod section serving also as a second means for releasing the golf ball when said knob is pushed downwards with respect to the tubular handle.

4,021,069

APPARATUS FOR REDUCING AERODYNAMIC DRAG

Alan S. Hersh, Sepulveda, Calif., assignor to Nose Cone Manufacturing Co., Inc., La Habra, Calif.

Continuation of Ser. No. 479,043, June 13, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,870
Int. Cl.² B60J *1/04*
U.S. Cl. 296—1 S **12 Claims**



1. Apparatus for reducing the aerodynamic drag of a cargo carrying vehicle of the type having forward, side and top walls, said forward wall being contained in a substantially vertical plane disposed normal to the direction of travel of said vehicle, said apparatus comprising:

an aerodynamic fairing carried on said forward wall for directing air flow about said vehicle, said fairing including:

side and top edge portions aerodynamically shaped to merge with said top and side walls of said vehicle adjacent said forward wall thereof;

a continuous contoured outer fairing surface extending away from said side and top edges and converging at a point of maximum extension;

said fairing surface being substantially symmetrical horizontally about a central vertical plane normal to said forward wall so that air encountered during forward movement of said vehicle is directed toward both of said side walls;

said fairing surface being asymmetrical vertically, with said point of maximum extension being disposed substantially vertically below the center of said fairing, so that the upper fairing surface above said point of maximum extension is substantially longer than the lower fairing surface therebeneath;

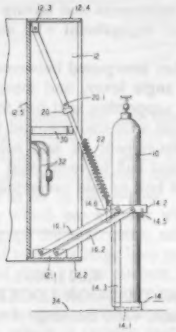
said fairing acting to reduce air drag on said vehicle by directing air encountered by said fairing surface in such a manner that substantially all of said air flows rearwardly toward and along both sides and top of said vehicle, with the major portion normally being directed over the top.

4,021,070

MECHANICAL LIFT

Frank Joseph Shea, 258 E. Shore Trail, Sparta, N.J. 07871

Filed Apr. 2, 1976, Ser. No. 673,253
Int. Cl.² A61G *3/00*; E02F *3/42*
U.S. Cl. 296—19 **9 Claims**



1. A mechanical lift for lifting (or lowering) an object to (or from) an elevated compartment comprising

a carriage in which said object can be removably secured,

rigid bar means pivotally connected to an upper portion of said carriage and to a lower portion of said compartment for guiding said carriage when being moved,

elongated telescoping means pivotally connected to an upper portion of said carriage and to an upper portion of said compartment for further guiding said carriage when being moved, and

means connected between said carriage and an upper portion of said compartment for counterbalancing the weight of said object when being moved.

4,021,071

SELF-STORING STEP STRUCTURE FOR VEHICULAR MOUNTING

Thomas W. Norman, 2817 NW. 64th St., Oklahoma City, Okla. 73112

Filed May 16, 1975, Ser. No. 578,155
Int. Cl.² B60R *3/02*
U.S. Cl. 296—62 **4 Claims**

1. In a truck of the type having a tailgate including a forward side and a rear side, and pivotally supported on the truck for pivotation about a horizontal axis between a vertically extending position and a horizontally extending position, said tailgate further including a lower edge positioned proximate the piv-

otal axis of the tailgate, and an upper edge spaced above the lower edge, said truck further including a horizontally extending bumper positioned below the tailgate and rearwardly of the plane occupied by the tailgate when the tailgate occupies said vertically extending position, the improvement which comprises:

a plurality of mounting brackets connected to said tailgate adjacent the upper edge thereof, and on the rear side thereof;

a self-storing step structure pivotally connected to said tailgate for pivotation through 180° about a horizontal axis, said step structure comprising:

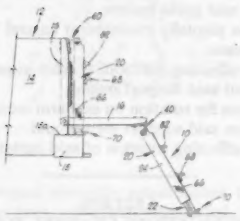
a first step section pivotally connected to said mounting brackets for pivotation about a horizontal axis through 180°, including pivotation to a position over the bumper and vertically aligned therewith at a time when the tailgate is in its vertically extending position, said first step section comprising:

a pair of spaced rails of C-shaped cross-section; and

at least one step member extending between and engaged with said spaced rails; and

an extensible step section disposed in substantially coplanar alignment with said first step section and comprising:

a second pair of spaced rails of C-shaped cross-section including ends slidably registering with, and nesting in, the spaced rails of said first step section; and



a step member extending between, and engaged with, said second rails of said extensible step section, said step member in said extensible step section including:

a step platform; and

a web secured to said step platform along one edge thereof and resting slidably upon the spaced rails of said first step section;

means for adjustably interlocking said first step section with said extensible step section at a selected position therealong whereby the overall length of said self-storing step structure can be selectively varied, and said step sections can be retained against relative sliding movement to undesirably change said selected length of the self-storing step structure; and

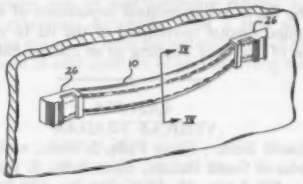
a foot plate secured across the ends of said second rails of said extensible step section remote from the ends thereof slidably registering with the rails of said first step section for supporting said step structure on the earth when said tailgate is pivoted to its horizontally extending position, and said step structure is pivoted downwardly from the horizontally extending tailgate to the ground, and for frictionally engaging the lower end of the self-storing step structure with the upper side of the bumper for storage and transport when the tailgate is in its vertically extending position.

4,021,072

INNER DOOR PULL FOR AUTOMOBILES

Wilfred E. Belanger, Rochester, Mich., assignor to U.S. Industries, Inc., New York, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,673
Int. Cl.² B60N 3/02
U.S. Cl. 296—71 17 Claims



1. An automobile door pull comprising:

an elongated metal insert;

a molded body of a resilient, flexible material generally hat-shaped in cross section, defining in cross section a first body portion and an integrally molded smaller second body portion projecting therefrom; said first body portion having an elongated first cavity extending the length thereof;

said metal insert being positioned within said first cavity; and

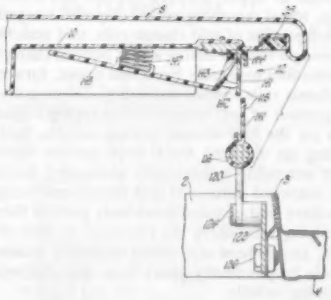
an empty second elongated cavity within said smaller second body portion adjacent at least one side of said metal insert substantially parallel to the length of said metal insert and opening into said first cavity and occupying a substantial portion of the cross section of said smaller second body portion whereby said empty second cavity gives said door pull a cushiony feeling when it is grasped.

4,021,073

COMBINED VENT AND ESCAPE HATCH

Donald L. Manning, 4002 Normanwood Drive, Orchard Lake, Mich. 48033

Filed Mar. 18, 1976, Ser. No. 668,100
Int. Cl.² B60J 7/10
U.S. Cl. 296—137 B 7 Claims



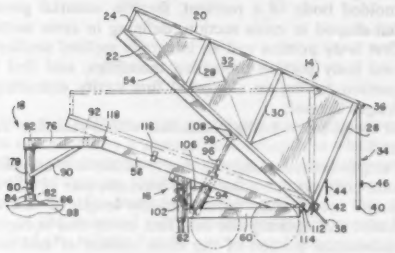
7. In combination with a lid for a vehicle roof opening, hinging means connected to the lid and adapted for mounting to the roof adjacent said opening, said hinging means accommodating upward tilting movement of the lid about an axis adjacent one side of said opening, means normally limiting said tilting movement to a partially open position of the lid accommodating ventilation of the vehicle via said opening, said limiting means comprising a first member fixed to the lid laterally of said axis and a second member adapted to be fixed to the vehicle roof and extending parallel to said first member, one of said members having a portion normally embracing a

portion of the other member, said member portions having apertures in alignment with each other when said one member portion is in its embracing relation with said other member portion, and a lever below and pivotally mounted to the lid for movement toward the lid in the direction in which the lid is tiltably openable about said axis, said lever having a projection normally engaging both said apertures but withdrawable therefrom in respone to said pivotable movement of the lever toward the lid to accommodate separation of said members and extended pivotal movement of the lid to a position enabling use of said roof opening as an escape hatch.

4,021,074
VEHICLE TRAILER

Jerome Jacob Heiser, Sioux Falls, S. Dak., assignor to Agri-Industries of South Dakota, Sioux Falls, S. Dak.

Filed Apr. 26, 1976, Ser. No. 680,060
Int. Cl.² B60P 1/16
U.S. Cl. 298—22 R **9 Claims**



1. A vehicle trailer having a trailer body, a trailer frame and a portion adapted for attachment to a towing vehicle, said trailer body including at least rear wall, side wall and bottom wall portions, said bottom wall portion forming the floor of said trailer body and extending upwardly and forwardly from the rear of said trailer body at a substantial angle, a trailer chassis disposed beneath and supporting said trailer body, said chassis including principal chassis rails disposed beneath said body floor in substantially parallel relation thereto, said principal chassis rails extending upwardly and forwardly for a substantial portion of the entire extend of said body floor so as to include an upper, forward portion and a lower, rearward portion, wheel mounting means disposed beneath said lower, rearward portion of said chassis rails, said attachment portion comprising a tongue having a rear portion thereof attached to and extending forwardly from said upper, forward portion of said chassis rails, means extending downwardly from a forward portion of said tongue for engaging trailer attachment means on the bed of said towing vehicle, said trailer thus including an elevated front body portion having the floor thereof extending substantially above and forwardly of said lower, rearward portion of said chassis and being adapted, in use, to have said elevated front body portion thereof disposed in overlying relation to the rearmost portion of said towing vehicle, and to have said wheel mounting means spaced substantially longitudinally apart from said rearmost portion of said towing vehicle.

4,021,075
EXCAVATORS

Robert W. Johns, 7318 - 50th St., Edmonton, Alberta, Canada

Filed Sept. 15, 1975, Ser. No. 613,324
Claims priority, application Canada, Sept. 23, 1974, 209775
Int. Cl.² E21D 9/10
U.S. Cl. 299—30 **5 Claims**

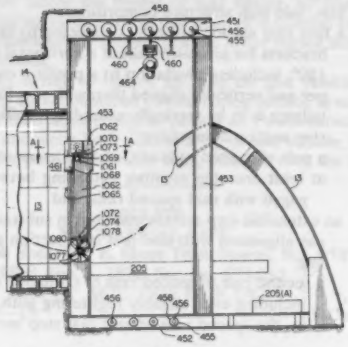
1. In the mining of tar sands, oil shales, or other friable mineral deposits, excavating apparatus including:

a. a supporting framework comprising a carriage having at least one excavator carrying member, said member being upright and of generally open channel section;

b. guide means attached to said upright member;

c. excavator support means constrained by said guide means for movement longitudinally of said member;

d. means for affecting movement of said support means within said guide means and comprising pressure actuate ram means positioned within said member and adapted to apply pressure to said excavator support means for vertically adjusting said excavator support means;



e. said excavator support means comprising a member slideably positioned within said section and maintained therein by said guide means;

f. arms means pivotally mounted at an end thereof to said support means;

g. means for affecting rotation, at least in part, of said arm means about said support means;

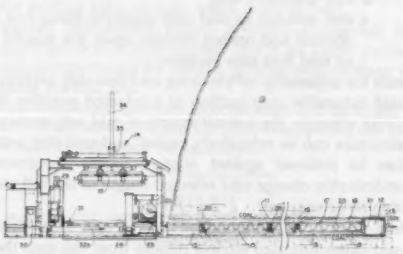
h. cutter means for rotation on said arm means at a position remote from said support means, and

i. means for affecting rotation of said cutter means.

4,021,076
WIRE COMMUNICATIONS CHANNEL FOR A PAIR OF UNITIZED AUGERS

Arthur L. Hawthorne, St. Clairsville, Ohio, and David R. Hazen, McMurray, Pa., assignors to Consolidation Coal Company, Ponca City, Okla.

Filed May 2, 1975, Ser. No. 574,186
Int. Cl.² E21C 27/22
U.S. Cl. 299—56 **6 Claims**



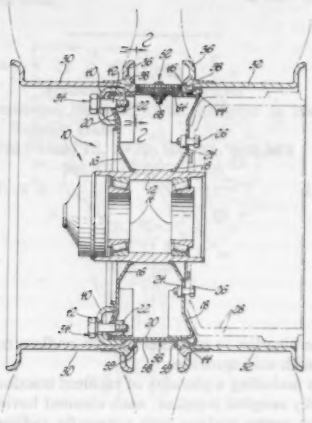
1. In a mining system having a plurality of pairs of augers rotatably joined by a spacing member at each end of said pairs of augers and a longitudinal member rigidly attached to said spacer members and wherein said system additionally includes an auger power unit coupled to the pairs of augers at one end and cutting heads coupled to the pairs of augers at the other end with remote sensing equipment mounted on the auger pairs near said cutting head, said system comprising:

a. a cable receiving means attached to said longitudinal member;
b. a cable having an outside diameter;
c. means for attaching said cable to said sensing equipment; and
d. means for inserting and removing said cable into and out of said cable receiving means.

4,021,077
DUAL TRUCK WHEEL ASSEMBLY HAVING AN ELLIPTICAL LOCKING CAM PLATE

William L. Pringle, Grosse Pointe Shores, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Sept. 5, 1975, Ser. No. 610,668
Int. Cl.² B60B *11/06*
U.S. Cl. 301—13 SM 25 Claims



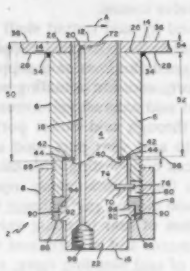
1. A vehicle wheel assembly; wheel means, first and second tire supporting rims removably supported on said wheel means, clamping means to apply a retaining force between said wheel means and said rims for clamping the rims together for preventing rotation of said rims relative to said wheel means, and rim lock means reacting between said rims for urging said rims apart and against said retaining force in response to relative rotation between said rims.

4,021,078
GAS JET PLUG ASSEMBLY

William F. Hutar, Watchung, and Donald G. Marting, Murray Hill, both of N.J., assignors to Coaltek Associates, Morristown, N.J.

Continuation of Ser. No. 484,824, July 1, 1974, abandoned.
This application Feb. 6, 1976, Ser. No. 655,912
Int. Cl.² B65G *53/16*
U.S. Cl. 302—24 17 Claims

17. Apparatus for introducing gas into a pipe adapted to convey granular particles comprising:
a gas connection means having a downstream end for positioning in a hole in the pipe and an upstream end, said gas connection means having an interior bore having a downstream end and an upstream end, said gas connection means having a gas jet nozzle extending from the downstream end of said bore of said gas connection means to a surface of the downstream end of said gas connection means for communication between said bore of said gas connection means and an interior of said pipe;
a fastening means for said gas connection means, said fastening means having a downstream end for mounting on said pipe, an upstream end at the opposite end of said fastening means, and an interior bore through which at least a portion of said gas connection means extends;
means for pointing said nozzle in a direction of movement of said granular particles within the pipe, said pointing means comprising:
an aperture at the upstream end of said fastening means, through a side wall of said fastening means, extending along a portion of the length of said fastening means from the upstream end of said fastening means; a locating member extending outwardly from a side of said gas connection means, at least the exterior end of said member disposed in said aperture of said fastening means; and

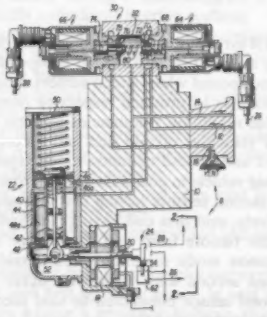


said gas jet nozzle aligned with said member; said aperture of said fastening means aligned with the direction of movement of said granular particles in said pipe when said downstream end of said gas connection means is positioned in said pipe, whereby said locating member of said gas connection means and said aperture of said fastening means cooperate to position the gas jet nozzle of said gas connection means to point in the direction of movement of granular particles in order to direct gas flowing through said nozzle in the direction of movement of said granular particles.

4,021,079
BLENDING VALVE FOR ELECTRO-PNEUMATIC BRAKES

Glen O. Bohusch, Watertown, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,022
Int. Cl.² B60T *13/74*
U.S. Cl. 303—3 9 Claims



1. An improved electro-pneumatic blending valve for a vehicle having dynamic and friction brakes, comprising;
first torque motor means acting on an output shaft for developing a first torque proportional to the braking force applied by said dynamic brake;
second torque motor means acting on said output shaft for

developing a second torque opposite to said first torque and proportional to the difference between the pressures acting at the inlet and outlet ports of said valve;

solenoid actuated supply valve means for controlling communication between said inlet port and said outlet port;

solenoid actuated exhaust valve means for controlling communication between said outlet port and a vent port;

spring means biasing said supply valve means to its open position and said exhaust valve means to its closed position;

first switch means for selectively connecting power to said supply valve means;

second switch means for selectively connecting power to said exhaust valve means;

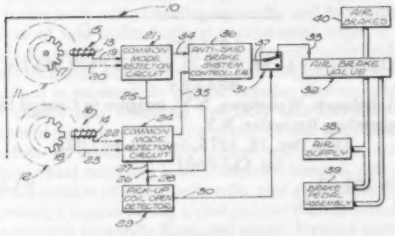
cam means moved by said output shaft for actuating said first switch means to open said supply valve means to supply pressurized fluid via said supply valve means to said outlet port; and for actuating said second switch means to open said exhaust valve means to release pressurized fluid through said outlet port via said exhaust valve means to said vent port, said cam means having contact surfaces cooperating with said first and second switch means for simultaneously opening said supply valve means and closing said exhaust valve means in the APPLY position of said blending valve, or closing said supply valve means and said exhaust valve means in the LAP position of said blending valve, or closing said supply valve means and opening said exhaust valve means in the RELEASE position of said blending valve.

4,021,080

ANTI-SKID BRAKE CONTROL SYSTEM AND COMPONENTS THEREOF

Said Sapir, Los Angeles, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 6, 1974, Ser. No. 495,226
Int. Cl.² B60T *8/00*
U.S. Cl. 303—92 **18 Claims**



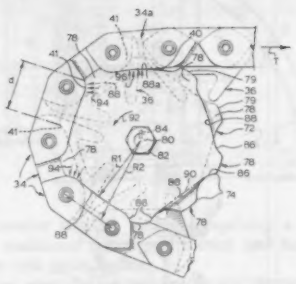
1. In a control system, the combination comprising: a motor vehicle having at least first and second independently rotable wheels; first and second wheel speed sensors mounted on said vehicle in a manner to produce respective output pulses of respective pulse repetition frequencies directly proportional to the angular velocities of said first and second wheels, respectively; first and second common mode rejection circuits mounted on said vehicle in positions remote from said sensors, said first and second sensors having first and second pick-up coils, respectively, said first coil having first and second long leads with outer remote from said first sensor connected to said first common mode rejection circuit, said second coil having first and second long leads with outer ends remote from said second sensor connected to said second common mode rejection circuit, said first and second common mode rejection circuits having first and second main output leads, respectively; and anti-skid brake system controller having first and second input leads connected from said first and second main output leads, respectively, and an output lead; an air brake valve; an air supply; a brake pedal assembly, said air supply being connected to said valve and said assembly, said assembly being connected to said valve; a set of air brakes connected from said valve, said valve having an electrical input lead such that a predetermined input signal thereon overrides control of said valve by brake pedal pressure to prevent a skid; a switch connected from said controller output lead to said valve lead; and a pick-up coil open detector connected from both of said common mode rejection circuits to said switch to disable the output of said controller in the event that an open should develop in either one of said coils or in both of them.

4,021,081

DRIVE SPROCKETS FOR VEHICLE TRACKS

Robert J. Orpana, Ste. Foy, Canada, assignor to Panatrac Manufacturing Corporation Limited, Toronto, Canada

Filed July 7, 1975, Ser. No. 594,138
Int. Cl.² B62D *55/12*
U.S. Cl. 305—35 R **7 Claims**



1. In combination, a sprocket and an endless track in engagement with said sprocket;

the track including a plurality of resilient traction elements pivotally coupled together, each element having a generally flat upper surface with outwardly radiused leading and trailing end portions;

and the sprocket including a peripheral surface which has the general profile of a regular polygon, the sprocket defining: an axis of rotation at the geometrical center of the polygon; and teeth at the corners of the polygon; each tooth having opposite side edges formed by portions of said peripheral surface, said portions being inwardly radiused to conform generally with said outwardly radiused leading and trailing end portions of the upper surfaces of the traction elements, and the said peripheral surfaces including portions between the teeth each defining a gentle outward curve, whereby, as the sprocket rotates in use, successive traction elements are engaged by said teeth and said outwardly curved surface portions progressively subject the upper surfaces of the elements to compressive loading cushioning movement of the elements into full engagement with the sprocket.

4,021,082

REPLACEMENT GROUSER BAR AND METHOD FOR MANUFACTURING THE SAME

Robert Rasmussen, 28511 Vista Tierra, San Pedro, Calif. 90732

Filed Apr. 2, 1975, Ser. No. 564,535
Int. Cl.² B62D *55/28*
U.S. Cl. 305—54 **15 Claims**

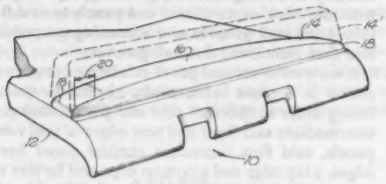
1. A replacement grouser bar for welding to a partially worn grouser bar comprising:

an elongated unitary steel bar cut from stock material two edges upon said bar,

one of said edges being contoured concavely to substantially conform to the contour of the worn grouser bar to which it is to be welded;

ends upon said bar having thicknesses exceeding the thickness of the primary portion of said bar;

said bar being differentially hardened such that the edge opposite said concavely contoured edge, said ends, and



portions of said bar adjacent thereto, are harder than that portion of said bar adjacent said concavely contoured edge, and a central region of said opposite edge is softer than said ends.

4,021,083

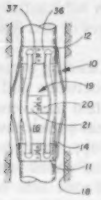
SNAP-LOCK END RING

Mark O. Anderson, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Mar. 18, 1976, Ser. No. 668,096

Int. Cl.² F16C *17/00*

U.S. Cl. 308—4 A **28 Claims**



1. A centralizer for attachment about a cylindrical object, comprising:

a. a plurality of leaf springs having an end portion and a bowed portion; and

b. circular end band means for attachment to said end portions of said leaf springs, for circumferentially spacing said leaf springs and for slidably positioning said spaced leaf springs in outwardly bowed position about a cylindrical object, said end band means including:

i. at least two arcuate portions;

ii. snap means for radially overlapping and rigidly and radially interlocking said arcuate portions upon forced transverse movement of said arcuate portions together into a circular configuration corresponding in shape to, but of greater diameter than, the exterior surface of said cylindrical object; and

iii. radial lock means for maintaining said snap means rigidly interlocked when a greater radial force is applied to one of said arcuate portions than to the other of said arcuate portions.

4,021,084

DRILLING BIT BEARING STRUCTURE

Lloyd L. Garner, 12100 Montecito, No. 167, Los Alamitos, Calif. 90720

Filed Feb. 4, 1975, Ser. No. 546,936

Int. Cl.² F16C *19/00*

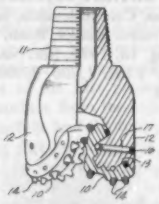
U.S. Cl. 308—8.2 **8 Claims**

1. A rock bit cutter cone comprising:

a body of high strength alloy steel;

a plurality of hard metal carbide inserts on the exterior of the steel body;

a bore in the steel body having a cylindrical bearing surface; and



a plurality of mutually spaced apart shallow pockets extending into the steel body from the bearing surface, each of said pockets being filled with a wear resistant material harder than the steel therebetween.

4,021,085

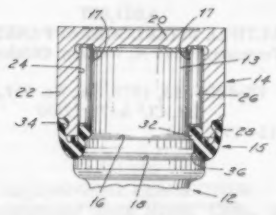
UNIVERSAL JOINT SEAL

John J. Willyard, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 6, 1975, Ser. No. 629,423

Int. Cl.² F16C *1/24*

U.S. Cl. 308—187.2 **13 Claims**



11. A bearing assembly for a universal joint comprising a journal cross member having a trunnion with an outwardly facing substantially cylindrical bearing surface;

a bearing cup having an inwardly facing substantially cylindrical bearing surface spaced apart from said outwardly facing bearing surface;

said bearing cup having a base portion engaging the end of said trunnion;

a plurality of needle bearings operatively interposed between said outwardly facing bearing surface and said inwardly facing bearing surface;

an elastomeric seal interposed between said journal cross member and said bearing cup;

said seal having spaced apart integral first and second annular lips;

said bearing member having an annular outwardly opening groove and said first lip being seated in said groove;

said second lip having a generally bulbous shape in cross section and sealingly engaging both said outwardly facing bearing surface and said inwardly facing bearing surface;

said journal cross member having a shoulder adjacent one end of said outwardly facing bearing surface;

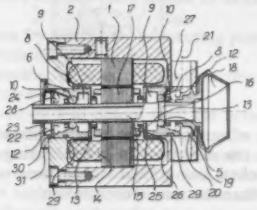
said seal having a curved portion in flush engagement with the surface of said journal cross member between said shoulder and said outwardly facing bearing surface.

4,021,086

ANTIFRICTION BEARING ARRANGEMENT FOR A HIGH SPEED ROTARY MACHINE PART

Zdenek Rajsigl, Brno, Czechoslovakia, assignor to ZVL Vyzkumny ustav pro valiva loziska, Brno, Czechoslovakia

Filed Aug. 18, 1975, Ser. No. 605,430
Int. Cl.² F16C 13/00, 33/00, 35/00
U.S. Cl. 308—189 R 13 Claims



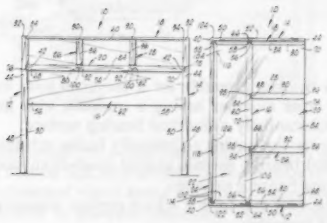
1. In an antifriction bearing arrangement for a rotor, comprising a housing defining a hollow cylindrical space therein, a shaft extending coaxially through the cylindrical space, an outer winding centrally disposed within and fastened to the housing, a rotor supported centrally on the shaft in alignment with the outer winding, a pair of antifriction bearings disposed around the shaft and individually positioned adjacent opposite axial ends of the rotor, each bearing having an outer ring comprising an outer raceway, a pair of inner raceways individually defined on the shaft surface underlying the respective bearings, the outer diameter of the outer rings of the bearings being at least as large as the outer diameter of the rotor, the internal capacity of the bearings corresponding to the amount of grease which is sufficient to maintain bearing lubrication over their entire life.

4,021,087

MULTIPLE INTERLOCKING PANEL DESK

James S. Ferguson, 10111 N. Western, Oklahoma City, Okla. 73114

Filed Nov. 13, 1975, Ser. No. 631,639
Int. Cl.² A47B 17/00
U.S. Cl. 312—195 5 Claims



1. A desk of multiple, detachably interlocking panels having top-accessible storage compartments, and having unobstructed leg and knee space comprising:

first and second horizontally spaced, parallel vertical end panels having mutually facing inner surfaces and coplanar lower edges, coplanar upper edges, coplanar front edges and coplanar rear edges, said vertical panels each further having a dovetail groove extending vertically downwardly from the upper edge thereof and opening in said inner surface, said vertically downwardly extending dovetail grooves each being positioned intermediate said front and rear edges of the respective end panel, and spaced from the front and rear edges of the respective end panel in which the respective dovetail groove is located, said vertical end panels further having a first pair of parallel, horizontally extending dovetail grooves projecting from the front edges of said vertical end panels inwardly to said first-mentioned dovetail grooves, and projecting perpendicular to said first-mentioned dovetail grooves, and said vertical end panels having a second pair of parallel, horizontally extending dovetail grooves projecting inwardly from the back edges of said end panels to said first-mentioned dovetail grooves and extending perpendicular to said first-mentioned dovetail grooves;

a first transverse vertical panel extending between said end panels in a plane substantially normal to the mutually facing inner surfaces of said end panels, and positioned intermediate said front and rear edges of said vertical end panels, said first transverse vertical panel having side edges, a top edge and a bottom edge and further including a dovetail tongue formed on each of said side edges thereof, each of said dovetail tongues on said transverse vertical panel extending into, and slidably received by, one of said dovetail grooves in the inner surface of one of said vertical end panels, whereby said first transverse vertical panel can be slidably inserted in the dovetail grooves in said first and second vertical end panels by insertion in the grooves from above, followed by downward sliding movement, the bottom edge of said first transverse vertical panel being spaced upwardly from the lower edges of said first and second vertical end panels to afford leg space below said first transverse vertical panel, said first transverse vertical panel and said dovetail grooves in said end panels having a common dimension such that the top edge of said first transverse vertical panel terminates in substantially the same plane as the coplanar upper edges of said first and second vertical end panels;

a first transversely extending horizontal panel projecting in a horizontal plane between said end panels and disposed on one side of said first transverse vertical panel, said first transverse horizontal panel having a front edge, a rear edge and a pair of opposed, parallel side edges, said first transverse horizontal panel further including a dovetail tongue on each of said side edges extending into and slidingly received by said first pair of parallel, horizontally extending dovetail grooves in said vertical end panels to slidingly support said first transverse horizontal panel in the dovetail grooves in said end panels, said first transverse horizontal panel having its rear edge abutting said first transverse vertical panel and forming with said end panels and said first transverse vertical panel a first storage compartment and constituting a horizontal storage compartment shelf in said desk spaced downwardly from the upper edges of said parallel vertical end panels and above the bottom edge of said first transverse vertical panel;

a second transverse horizontal panel extending between said end panels in a horizontal plane and including a front edge, a rear edge and two side edges, said second transverse horizontal panel having dovetail tongues on each of said side edges extending into and slidably received by said second pair of horizontally extending dovetail grooves in the inner surfaces of said first and second end panels whereby said second horizontal panel can be slidably inserted between and removed from said vertical end panels, said second transverse horizontal panel forming with said end panels and said first transverse vertical panel a second storage compartment and constituting a second horizontal storage compartment shelf in said desk positioned on the opposite side of said transverse vertical panel from said first transverse horizontal panel, said second transverse horizontal panel having its front edge abutting said first transverse vertical panel;

said first and second transverse horizontal panels, conjunctively with said first transverse vertical panel, fixing the spacing between said end panels, and said first and second transverse horizontal panels preventing canting and pivoting of said end panels about the line of interlock of said end panels with said first transverse vertical panel

where the dovetail tongues of said vertical panels detachably interlock with the vertically extending dovetail grooves in the inner surfaces of said first and second end panels; and

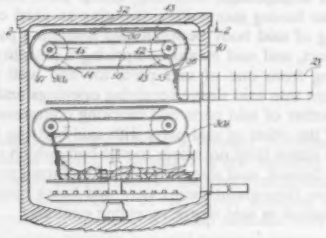
a top panel having side edges and extending between the end panels and removably supported by the upper edges of said end panels and the top edge of said first transverse vertical panel to provide a top for said desk and a closure at the upper side of the storage compartments formed by the cooperation of said top panel and said first and second horizontal panels with said first transverse vertical panel.

4,021,088

DISH STABILIZER FOR DISH WASHING MACHINES

James M. Murray, 9129 S. Crescent Court, Oak Lawn, Ill. 60453

Filed Apr. 7, 1976, Ser. No. 674,681
Int. Cl.² B08B *3/00*; A47L *15/00*
U.S. Cl. 312—311 3 Claims



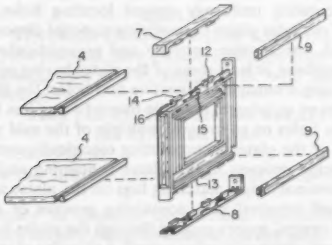
1. A stabilizer for dishes contained in the work-basket of a dish washing machine comprising a limp mesh designed to be lowered on the dishes, a substantially horizontal looped drive means between the front and rear of the dish washing machine, a connection between the workbasket and the drive means to exchange its runs when the work-basket is pushed into the dish washing machine, an endless belt conveyor with one end of said mesh extending over the upper run thereof and attached to said conveyor, the other end of the mesh having a connection with the work-basket to be drawn rearwardly when the latter is pushed as stated, and the conveyor having an overdrive to lower the mesh with slack on and between the dishes during their rearward travel.

4,021,089

KNOCK DOWN MODULAR UNIT AND ASSEMBLIES THEREOF

Paul S. Bush, c/o Bush Brothers Products Corp., 312 Fair Oak St., Little Valley, N.Y. 14755

Filed Jan. 15, 1976, Ser. No. 649,551
Int. Cl.² F16B *12/00*; A47B *43/00*
U.S. Cl. 312—257 R 13 Claims



1. Means for connecting two components suitable for use in a modular unit in which the components are interengaged along adjacent surfaces, said means comprising:

A. a plurality of first and second L-shaped projections aligned on a surface of a first component, a leg of each projection extending from the surface of the component and a foot portion of each projection extending laterally of the leg, a tapered surface on the foot portion facing the surface, the legs of the first projections being spaced laterally on the surface from the legs of the second projections on the surface and the foot portions of said first projections being directed opposite to and toward the foot portions of said second projections; and

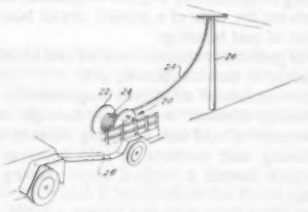
B. a plurality of first and second L-shaped projections aligned on a surface of a second component, a leg of each projection extending from the surface of said second component and a foot portion of each projection extending laterally of the leg, a tapered surface on the foot portion facing said surface, the legs of the projections being in substantial alignment with each other and the foot portions of the first projections being directed opposite to and away from the foot portions of said second projections, the legs on the projections on the surface of said first component being spaced sufficiently laterally to admit the foot portions of the projections on the surface of said second component and the foot portions of the projections on the surface of the first component being spaced sufficiently to admit the legs of the projections on the surface of said second component, the tapered surfaces of said projections on the surface of the first component being adapted to frictionally engage the tapered surfaces of the projections on the surface of said second component.

4,021,090

GROUND WIRE CONNECTOR

Arthur E. Fredericksen, North Haven, Conn., assignor to Fargo Mfg. Company, Inc., Poughkeepsie, N.Y.

Filed June 30, 1976, Ser. No. 701,210
Int. Cl.² H01R *39/00*
U.S. Cl. 339—5 R 8 Claims



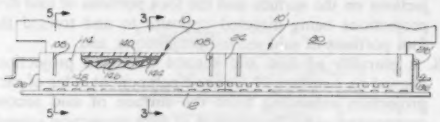
1. A rotating ground connector comprising: means for coupling the connector to a reel rotatably mounted on a shaft, bearing means with one portion connectable to the reel so as to rotate therewith and a second portion connectable to the shaft with the one portion rotatable with respect to the second portion, means for coupling the second portion with a grounded conductor, and the connector providing an electrical path from the conductor on the reel to the grounded conductor when connected thereto and while permitting relative rotation between the reel and grounded conductor.

4,021,091

ZERO FORCE PRINTED CIRCUIT BOARD CONNECTOR

John William Anhalt, Orange, and James Harvey Curley, Costa Mesa, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 13, 1975, Ser. No. 586,645
Int. Cl.[2] H01R *1/07*
U.S. Cl. 339—75 MP 9 Claims



1. A printed circuit board connector comprising:
a mounting member having two rows of holes therein;
two rows of resilient contacts having lower mounting portions mounted in said two rows of holes respectively in said mounting member;
each said contact having an upper contact portion and an intermediate region between said upper and lower portions, the intermediate regions of said contacts of said two rows of contacts being inclined upwardly toward each other;
an elongated hollow insulative housing mounted over said contacts onto said mounting member, said housing having an upper wall with a printed circuit board receiving slot therein between said two rows of contacts;
a vertically slidable, inverted, insulative hollow shell mounted over said two rows of contacts within said housing, said shell having an upper wall with a printed circuit board receiving slot therein aligned with said first-mentioned slot, said shell having cam surface means thereon engaging said intermediate regions of said contacts of said two rows of contacts, said cam surface means actuating said upper portions of said contacts of said two rows of contacts transversely towards each other upon downward movement of said shell in said housing; and
elongated longitudinally movable actuating cam means in said housing between said upper walls of said housing and said shell, movement of said actuating cam means moving said shell downwardly to simultaneously actuate said contacts, said actuating cam means comprising a pair of parallel, spaced cam rods on opposite sides of a vertical plane passing through said slots.

9. A printed circuit board connector assembly comprising:
a mounting member;
a pair of elongated insulative housings mounted in longitudinal alignment on said mounting member, said housings having longitudinally aligned continuous slots therein for receiving the edge of a printed circuit board longer than either of said housings;
a row of resilient contacts in each of said housings positoned adjacent to the slot therein; and
a single continuous elongated longitudinally movable cam actuating element extending through said housings, movement of said cam actuating element simultaneously actuating said contacts in said housings to shift said contacts toward a vertical plane passing through said slots.

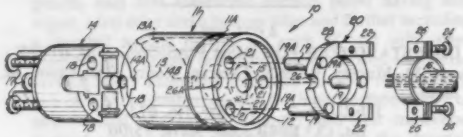
4,021,092

ELECTRICAL CONNECTOR

John E. Ericson, Jr., Willoughby, Ohio, assignor to The Ericson Manufacturing Company, Willoughby, Ohio

Filed June 9, 1975, Ser. No. 585,028
Int. Cl.[2] H01R *13/58*
U.S. Cl. 339—103 R 5 Claims

1. An electrical connector comprising a body defining a chamber having an end wall closing one end of said body, electrical elements carried by an insulating part located in said chamber, said body having an integral molded construction of resilient material and including a generally tubular portion, means defining an opening in said end wall for an electrical cable to extend therethrough into said chamber for connection with said electrical elements, said end wall having a portion defining said opening and which has a fluidtight sealing engagement with said cable, a plurality of longitudinally extending sleeve receiving openings in said end wall, clamp means for clamping said electrical cable prior to its entry into said chamber, said clamp means comprising a clamp part and means for securing said clamp part to said insulating part, said means comprising threaded fasteners which extend into



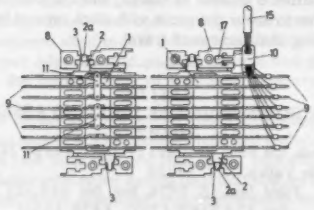
threaded engagement with said clamp part, said electrical connector having means for preventing an axial compressive clamping of said body between said insulating part and said clamp part, and said means comprising a plurality of sleeves extending from one of said parts for end wall penetrating movement into said sleeve receiving openings and for engaging the other of said parts and blocking compressive engagement of the other of said parts with said body so that a compressive action does not occur to said body which would cause bulging thereof, said sleeves being of uniform cross-sectional dimension throughout their extent and being removably slidably received in said sleeve receiving openings.

4,021,093

CONNECTION FRAME FOR ELECTRICAL INSTALLATIONS

Gottfried Glaesel, Ascona, Switzerland, assignor to Hego Electric G.m.b.H., Switzerland

Filed June 25, 1975, Ser. No. 590,172
Claims priority, application United Kingdom, Feb. 28, 1975, 8427/75
Int. Cl.[2] H01R *9/16*
U.S. Cl. 339—198 H 5 Claims



1. An electrical modular connection assembly comprising two spaced parallel locating members each provided with a row of accurately uniformly spaced locating holes, and a plurality of modular plates of insulating material disposed face to face with one another between and perpendicular to the locating members, at least some of the plates having on at least one side a spigot engaging respective said holes, the thickness of the plates or an integral multiple thereof being less than the pitch of the holes or an integral multiple of the said pitch, at least some of the plates incorporating electrically conductive terminal strips, grooves in the plates containing and deeper than the terminal strips, matching lugs on the plates arranged to enter said terminal strip containing grooves of adjacent plates, and central spaces passing through the plates from face to face across which said strips extend, a plurality of the terminal strips extending across a single central space, each one of said strips being located in a groove on each side of such

central space, the plates being provided on their faces with projections and matching recesses free of terminal strips for interengagement of adjacent plates.

4,021,094

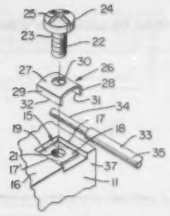
CONTROL DEVICE HAVING IMPROVED TERMINAL MEANS AND METHOD OF MAKING THE SAME

Henry F. Hild, and Siegfried E. Manecke, both of Indiana, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 499,328, Aug. 21, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 630,032

Int. Cl.² H01R *9/10*

U.S. Cl. 339—246 **1 Claim**



1. In a control device having a housing provided with a terminal means having a threaded screw member with its shank threadedly carried thereby for lead attachment thereto between an enlarged head of the screw member and said terminal means, a resilient retainer clip disposed between said head of said screw member and said terminal means, said clip initially being under compression between said head of said screw member and said terminal means to tend to hold said screw member in its threaded relation with said terminal means, a lead disposed between said clip and said terminal means, said clip thereafter being disposed in deformed condition against said lead to hold said lead to said terminal means, said clip being in a substantially U-shape to define a cross-member and a pair of legs thereof, said cross-member having an opening therethrough telescopically receiving said shank of said screw member, said legs of said U-shaped clip being disposed between said head of said screw member and said terminal means and being disposed on opposite sides of said shank of said screw member, said lead being disposed between one of said legs of said U-shaped clip and said shank of said screw member, said screw member being in a tightened condition toward said terminal means to cause said head thereof to compress said cross-member of said clip toward said terminal means and thus against said lead to provide said deformed condition of said clip to hold said lead to said terminal means, said housing having a recess adjacent said terminal means that defines a pair of spaced apart side walls adjacent said legs of said clip, the improvement wherein said tightened screw member has caused said legs of said clip to be bowed outwardly against said side walls of said housing.

4,021,095

STACKED CARRIER STRIP ASSEMBLY

Robert John Kinkaid, New Cumberland, and John Carl Asick, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 21, 1974, Ser. No. 444,621

Int. Cl.² H01R *11/08*

U.S. Cl. 339—276 SF **6 Claims**

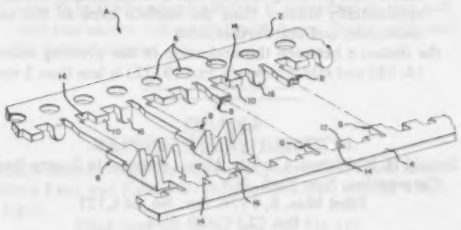
1. a carrier strip fed electrical terminal assembly comprising:

a plurality of stamped and formed electrical terminals spaced serially along an integral carrier strip,

said carrier strip comprising a pair of spaced metal strips with said terminals bridging between the metal strips,

the opposed inner side margins of said metal strips being provided with alternating tab portions and recess portions,

said tab portions being bent out of the plane of said metal strips in depending relationship therefrom, and



said tab portions of one length of said carrier strip being adapted for registration within the recess portions of another length of said carrier strip when said lengths of said carrier strip are in stacked relationship with the terminals of said one length of carrier strip alternating with the terminals of said another length of carrier strip.

4,021,096

ELECTRODYNAMICALLY CONTROLLABLE PIVOTING MIRROR DEVICE

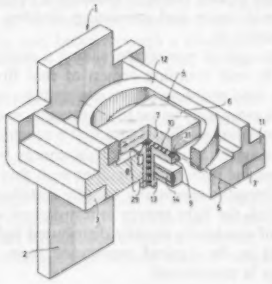
Jan Cornelis Willem Dragt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,480

Claims priority, application Netherlands, Oct. 20, 1975, 7512258

Int. Cl.² G02B *27/17*

U.S. Cl. 350—6 **6 Claims**



1. An electrodynamically controllable pivoting mirror device for an apparatus for optically reading the information tracks of an information carrier with the aid of a radiation beam produced by a radiation source, in particular for a video-disc player which employs optical reading, the device comprising:

a frame,

a pivoting mirror which is mounted on the frame so as to be pivotable about a pivotal axis or a pivot point and comprising a base having a light-reflecting surface,

a mirror bearing arrangment which co-operates with the underside of the pivoting mirror which faces away from the reflecting surface, which arrangement comprises an amount of an elastic rubber-like plastic which is disposed between the underside of the pivoting mirror and substantially rigid stationary parts of the device, as well as

electrodynamic control means for causing the pivoting mirror to pivot under the influence of an electrical voltage and comprising permenent magnets and electrical control coils, characterized in that

the elastic rubber-like plastic compound is connected to the underside only of the mirror,

the stationary part of the device to which the plastic compound is connected, at its side which is nearest the underside of the pivoting mirror, has a cross-section which is substantially smaller than the surface area of the said underside, and that furthermore

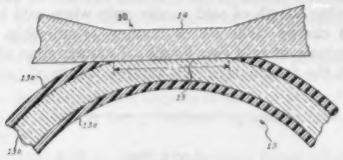
the distance between the underside of the pivoting mirror (4, 18) and said stationary part (9, 22) is less than 3 mm.

4,021,097

DISTRIBUTIVE TEE COUPLER

Donald H. McMahon, Carlisle, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,727
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 9 Claims



1. An optical coupling apparatus comprising:

a first optical waveguide having a multiplicity of light propagating fibers disposed to lie between parallel planes, establishing an over-all width therebetween, each fiber including a light propagating core, all of said cores having essentially equal refractive indexes and essentially equal heights with each core surrounded by a cladding for maintaining propagating light therewithin, portions of said cladding being removed for a predetermined length on each of said fibers to establish a coupling region such that said cores and remaining cladding are continuous therethrough;

a second optical waveguide having a coupling region coupled to said coupling region of said first optical waveguide, said coupling region possessing a length, width and height essentially equal to said length, width and height of said coupling region of said first waveguide, said coupling providing for a transfer of light energy between said first and second optical waveguides such that the light energy transferred is essentially equally distributed in the guide to which the light energy is transferred while continuous flow of essentially equally distributed light energy is mainained in the optical waveguide from which the light energy is transferred.

4,021,098

FIBER BUNDLE CONSOLIDATION

Ronald L. McCartney, Orange; Vaughn C. Hogan, Sun Valley; Eleanor A. Landgreen, Temple City, and Michael I. Bauerkemper, Cerritos, all of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

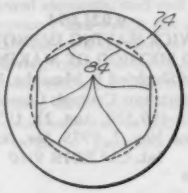
Filed Sept. 4, 1975, Ser. No. 610,223
Int. Cl.² G02B 5/16
U.S. Cl. 350—96 C 11 Claims

1. A fiber optic cable for use in a fiber optic connector comprising:

a fiber optic bundle including a plurality of light transmitting fibers terminating in a planar end surface;

a hollow ferrule compressed around said bundle having a forward end coplanar with said end surface, said fibers being arranged in a closed pack array in the bore in said ferrule; and

said bore having a generally cylindrical wall with circumferentially spaced, longitudinally extending, flat surfaces thereon extending rearwardly from said forward end of said ferrule for minimizing compression hoop effects on the peripheral fibers of said bundle, said spaced flat surfaces being joined by arcuate segments of said cylindrical wall.

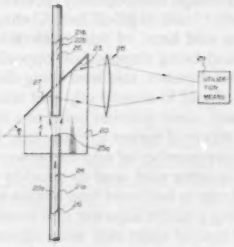


4,021,099

OPTICAL COUPLERS FOR FIBER OPTIC COMMUNICATION LINKS

Brian S. Kawasaki, Carleton Place, and Derwyn C. Johnson, Ottawa, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jan. 12, 1976, Ser. No. 648,585
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 6 Claims



1. A fiber optic coupler for an optical transmission line comprising:

a first length of multi-mode optical fiber having a first end for serially connecting into the optical line and a second end, and a second length of multi-mode optical fiber having a first end for serially connecting into the optical line and a second end, the second end of the second fiber being moveably mounted with respect to the second end of the first fiber substantially along a common axis so as to face one another at a variable distance *l*, where *l* 0, such that the portion of the optical energy leaving the second end of the first fiber which is launched into the second end of the second fiber is a function of the variable distance *l;* and

reflective surface means mounted about the second fiber and facing the second end of the first fiber for reflecting the remaining portion of the optical energy leaving the second end of the first fiber out of the coupler.

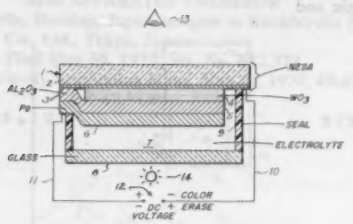
4,021,100
ELECTROCHROMIC DEVICE HAVING AN ELECTROLYTE CONTAINED IN A SOLID POROUS INSULATING LAYER

Robert Domenico Giglia, Rye, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 502,584, Sept. 3, 1974, abandoned. This application Apr. 23, 1976, Ser. No. 679,616

Int. Cl.² G02F *1/28*

U.S. Cl. 350—160 R **7 Claims**



1. In a variable light transmission device which comprises a conductive light transmitting substrate having a layer of a persistent electrochromic material as a light modulating material, a counter-electrode, and an ion conducting layer, an improved ion conducting layer comprising a solid layer of porous electrical insulating material as a support surface in contact with said persistent electrochromic material and said counter-electrode and an electrolyte means to permeate said support surface.

4,021,101
OPTICAL FOCUSSING DEVICE FOR FOCUSSING A RADIATION BEAM

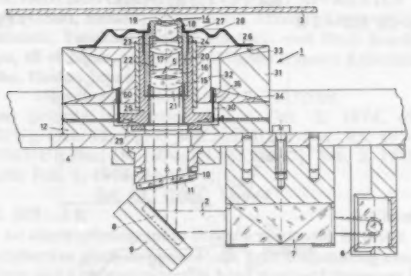
Eduard Camerik, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 16, 1975, Ser. No. 568,623

Claims priority, application Netherlands, Mar. 10, 1975, 7502803

Int. Cl.² G02B *7/04*

U.S. Cl. 350—255 **7 Claims**



1. An optical focussing device for focussing a radiation beam from a radiation source on a record carrier, in particular for focussing a light beam from a light source on the reflecting surface of a video record, which device comprises:

a frame

an objective comprising a number of optical lenses disposed in a lens mount,

an electromagnetic drive system for axially moving the objective in the direction of its optical axis relative to the frame and comprising a toroidal permanent magnet mounted on said frame and providing a cylindrical air gap and a movably mounted coil in said air gap, and

a parallel guide for the axial guidance of the objective relative to the frame, characterized in that

the parallel guide comprises a cylindrical bearing bush which is connected to the frame, and

the lens mount of the objective is an accurate axially slidable fit in the bearing bush and is connected to said coil, said lens mount and parallel guide being coaxial with said permanent magnet.

4,021,102
AUTO-REFRACTOMETER

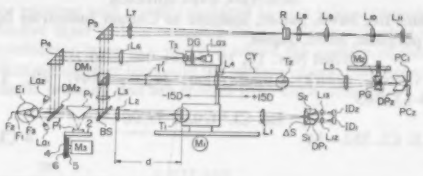
Tadashi Iizuka, Machida, Japan, assignor to Kabushiki Kaisha Hoya Lens and Kabushiki Kaisha Sokkisha, both of Tokyo, Japan

Filed Sept. 27, 1974, Ser. No. 510,127

Claims priority, application Japan, Nov. 26, 1973, 48-132340

Int. Cl.² A61B *3/10*; G10N *21/48*

U.S. Cl. 351—13 **6 Claims**



1. An auto-refractometer for measuring diopter of a patient's eye, comprising:

means for producing a beam of measuring rays, said means including a pair of spaced infrared ray emission diodes, a V-shaped coincidence prism arranged with respect to said diodes to converge rays emitted by said diodes towards a beam path, and means for alternately driving said diodes;

an optical system including a beam transmitting collimator for projecting said beam through a slit to said eye to be focussed on the retina and reflected by the retina and cornea,

reflection means for directing the beam reflected from said eye through a receiving collimator towards an interference bar oriented to interfere with that portion of the reflected beam reflected by said cornea, a split prism for dividing the reflected beam from said retina which passes the interference bar, and a pair of photoelectric elements respectively responsive to the divided portions of said reflected beam to produce electrical outputs;

a movable mechanism operatively related to said optical system; and

circuit means responsive to differences between said electrical outputs for actuating the movable mechanism to thereby move said optical system by an amount corresponding to the diopter of the eye.

4,021,103
OPHTHALMIC MOUNTING ARRANGEMENTS

Tiberio Gaspari, 165 Locust Ave., Rye, N.Y. 10580

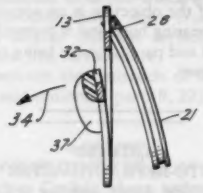
Filed July 7, 1975, Ser. No. 593,652

Int. Cl.² G02C *5/06*

U.S. Cl. 351—126 **8 Claims**

2. In an ophthalmic mounting arrangement for a pair of removable lenses, a unitary bifurcated frame of rigid material defining a main surface having a relatively large radius of curvature, said frame having a pair of hollow lens mounting rims of relatively large height for receiving said lenses and interconnected by a hollow bridge area of relatively small height whereby communication between the interiors of the lens mounting rims is effected unobstructedly through the

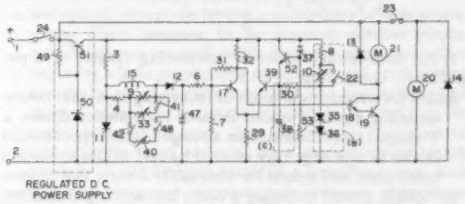
interior of the bridge area, the lower peripheral edge of the bridge area being resiliently deformable out of the main surface of the frame to facilitate insertion and removal of the individual lenses.



4,021,104
FILM-FEEDING SPEED CONTROLLING DEVICE FOR SOUND-CINECAMERA

Isami Ito, Suwa, Japan, assignor to Chinon Industries Incorporation, Suwa, Japan

Filed Nov. 10, 1975, Ser. No. 630,286
Claims priority, application Japan, Nov. 20, 1974, 49-133803
Int. Cl.² G03B *31/00*
U.S. Cl. 352—14 **4 Claims**



1. A film-feeding speed controlling device for sound-cinecameras comprising a motor for driving a capstan at uniform velocity, a motor for feeding a film intermittently, a detecting switch for detecting any superfluity or insufficiency of the film feed by said film-feeding motor relative to the film feed by said capstan driving motor and generating corresponding sag-signals, a speed-controlling circuit connected to said film-feeding motor and comprising a tachometer generator for maintaining the stability of the speed of said motor, and a sag-detecting circuit comprising said detecting switch, characterized in that said sag-detecting circuit is connected to a regulated power supply and the output thereof is connected to the controlling means of said speed-controlling circuit through a delay circuit, whereby said sag signals generated by said detecting switch are transmitted to said controlling means independently of said speed-controlling circuit for regularlizing fluctuations in the number of revolutions of said film-feeding motor arising from fluctuations in voltage of said power source of the film-feeding motor and fluctuations in load of the film.

4,021,105
APPARATUS FOR PROJECTING ENLARGED VIDEO IMAGES

Stanley D. Schubach, Salt Lake City, Utah, assignor to Tapehead Company, Inc., Salt Lake City, Utah

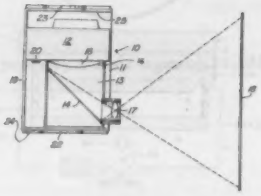
Filed Nov. 5, 1975, Ser. No. 629,035
Int. Cl.² G03B *21/14*; A47H *81/06*
U.S. Cl. 353—119 **6 Claims**

1. Apparatus for projecting enlarged video images, comprising in combination:

a housing having vertical sides, said housing having a pair of cylindrical support means extending outwardly respectively from mutually opposed vertical sides of the housing;

a frame for supporting said housing having a pair of mutually opposed vertical sides in register with said vertical sides of said housing, said frame sides each having notches adapted to pivotally hold said cylindrical support means so as to permit rotational movement of said housing about a first horizontal axis concentric with said cylindrical support means;

a television receiver moveably mounted in said housing for rotation about a second axis perpendicular to said first axis; and

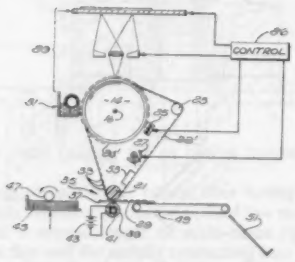


enlarging lens means movably mounted in said housing so as to be positionable adjacent said television receiver in said housing, for receiving video images said television receiver being normally positioned in said housing for normal viewing, and wherein when enlarged images of the television receiver are to be projected, the television receiver is rotated about said second axis, the enlarging lens means is positioned adjacent the television receiver to receive images therefrom, and the housing is rotated one hundred eighty degrees about said first axis to dispose said television receiver upside down so that the projected images will be disposed right side up from said television receiver and projecting enlarged video images.

4,021,106
APPARATUS FOR ELECTROSTATIC REPRODUCTION USING PLURAL CHARGES

Joseph Gaynor, Cleveland, Ohio, assignor to Bell & Howell Company, Chicago, Ill.

Division of Ser. No. 343,621, March 21, 1973, Pat. No. 3,843,361. This application Aug. 15, 1974, Ser. No. 497,602
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **7 Claims**



6. An electrostatic reproduction device, comprising:

a photoconductive surface;

means for uniformly charging said photoconductive surface to a predetermined polarity;

means for charging one side only of a sheet of insulating transfer material to said polarity;

means for thereafter temporarily placing said charged sheet of insulating transfer material on said photoconductive surface with said one side thereof in contact with said photoconductive surface;

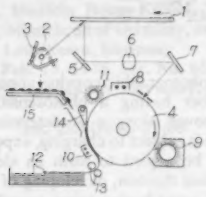
means for exposing said photoconductive surface to a light pattern with said transfer material in place;
means for charging the other side of said transfer sheet to a constant voltage;
means for developing said transfer sheet to form a visible image thereon; and
means for fixing said visible image.

4,021,107

ELECTROPHOTOGRAPHIC DUPLICATION METHOD AND APPARATUS THEREFOR

Shizuo Morita, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,374
Claims priority, application Japan, May 31, 1974, 49-62075
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **8 Claims**



1. An electrophotographic duplication method comprising the steps of illuminating information on an original to be duplicated by a light source at an illuminating station, directing the available illumination to said illumination station, exposing a photosensitive surface to the light representative of said information to form an electrostatically latent image on said surface, deenergizing said light source after illumination is complete, developing said electrostatic latent image to render said image visual, conveying said visual image to a fixing station and reenergizing said light source and directing the available illumination to said fixing station, thermally fixing said visual image at the fixing station via the heat generated by said light source.

4,021,108

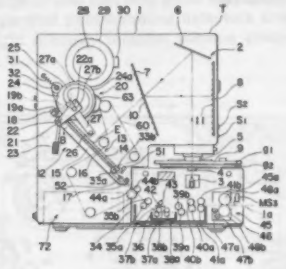
ELECTROPHOTOGRAPHIC COPYING APPARATUS

Yoshihiro Ozaki, Isehara; Takao Saijo, Mitaka; Kenjiro Ishii, Yokohama; Yasukuni Omata, Hachioji, and Shoji Kondo, Tokyo, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sept. 22, 1975, Ser. No. 615,708
Claims priority, application Japan, Oct. 2, 1974, 49-119593[U]; Oct. 15, 1974, 49-124823[U]; Nov. 13, 1974, 49-137947[U]; Dec. 19, 1974, 49-155319[U]; Feb. 3, 1975, 50-14630; Feb. 4, 1975, 50-16644[U]
Int. Cl.² G03G *15/044*
U.S. Cl. 355—3 R **6 Claims**

1. In an electrophotographic copying apparatus in which a photoconductive plate composed of a light transmitting electrode plate and a photoconductive layer disposed thereover is pressed with a pressing electrode plate which has an electrically conductive elastic pressure pad thereon which is compressed when pressed against the photoconductive plate, with a transfer material of an electrically insulating nature between the photoconductive plate and the pressure pad while an image of an original to be copied is projected through said light transmitting electrode plate and a predetermined potential is applied between said light transmitting electrode plate and said pressing electrode plate, the improvement comprising:

mounting means for mounting said pressing electrode plate for pivotal movement about a pivotal axis where an extension of the plane of the surface of said photoconductive layer and an extension of the plane of the surface of said conductive elastic pressure pad in the compressed condition intersect each other; and
pressing control means coupled to said pressing electrode plate for pivotally moving said pressing electrode plate



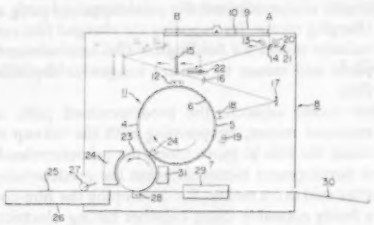
for pressing said transfer material against said photoconductive layer and for releasing the same from said photoconductive layer to a position where the surface of said photoconductive layer and the surface of said conductive elastic pressure pad are spaced from each other.

4,021,109

ELECTROPHOTOGRAPHIC COPYING APPARATUS

Hidetoshi Tanaka, Musashino; Tadashi Sato, Kokubunji, and Toshiro Kasamura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 29, 1975, Ser. No. 609,097
Claims priority, application Japan, Sept. 2, 1974, 49-100672
Int. Cl.² G03G *15/28*
U.S. Cl. 355—8 **7 Claims**



1. In an electrophotographic copying apparatus for forming on a photosensitive medium electrostatic images corresponding to an original to provide copies thereof, an improvement comprising:

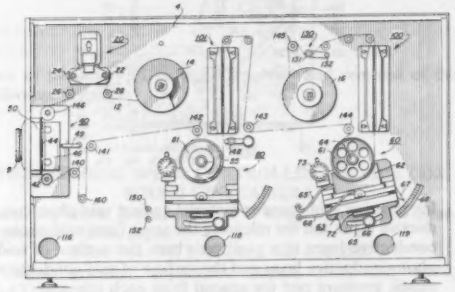
an original carriage for carrying thereon the original;
optical scanning means having a plurality of reciprocally movable optical scanning units for scanning the original carried on said original carriage, wherein each of said optical scanning units has a first and a second reciprocally movable mirror, and wherein each said first mirror moves simultaneously with its corresponding second mirror at a velocity ratio of 2 : 1;
a photosensitive medium; and
means for projecting the scanned image on said photosensitive medium, and means including a charger for forming on said photosensitive medium electrostatic images corresponding to the original scanned by said optical scanning means;
said optical scanning units of said optical scanning means being operable to successively scan said original.

4,021,110

PHOTOCOPYING CAMERA AND PROCESSING DEVICE

Arnold L. Pundsack, Oakville, Canada, assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 30, 1975, Ser. No. 573,294
Int. Cl.² G03G 15/10
U.S. Cl. 355—10 5 Claims



1. An apparatus for exposing and developing film comprising:

film supply means for holding a supply of film and dispensing it upon demand, said supply means being under a torque opposite in direction to that in which the film is being dispensed;

means for guiding the film along a predetermined path from said supply means to a takeup means;

charging means adjacent the predetermined path for depositing a uniform charge upon the surface of the film;

exposure means adjacent the predetermined path, after said charging means, for exposing the charged film comprising vacuum means for holding the film in a substantially flat plane and means to control imagewise exposure of the film;

drive means adjacent the predetermined path, after the exposure means, cooperating with the takeup means to cause the film to move along the predetermined path;

first development means adjacent the predetermined path, after said drive means, for developing the film comprising a freely rotatable drum member having electrical means to heat the surface thereof, said surface adapted to contact film whereby the film is developed;

overcoating means adjacent the predetermined path, after said first development means, for creating a liquid meniscus of overcoating materials through which the developed film passes comprising a drum member mounted on a shaft for free rotation, a shoe member having a curved surface substantially the same radius as the drum member, said shoe member supported adjacent the drum member for adjustable movement into close proximity of the drum member along the periphery thereof to form a gap therewith, and means to deposit and remove overcoating fluid from the gap created between the drum member and the shoe member;

drying means adjacent the predetermined path, after said overcoating means, for passing air over the film;

said takeup means being under a torque for receiving the film;

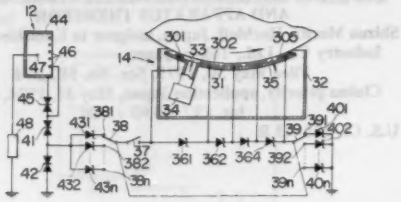
and second development means adjacent the predetermined path, after said drive means and before said first development means.

4,021,111

DEVELOPING DEVICE IN ELECTROPHOTOGRAPHIC COPYING APPARATUS

Shoji Kuroishi, Yokohama, and Manabu Mochizuki, Kawasaki, both of Japan, assignors to Ricoh Co., Ltd., Japan

Filed June 6, 1975, Ser. No. 584,294
Claims priority, application Japan, June 10, 1974, 49-65721
Int. Cl.² G03G 15/10
U.S. Cl. 355—10 14 Claims



1. In an electrophotographic copying apparatus comprising a movable member having a photosensitive surface and adapted to be moved along a predetermined path during which said surface is subject to charging, exposing to an image of an original to be copied to form an electrostatic latent image of the original thereon, developing of the latent image with a developing agent having toner, transferprinting of the developed image onto copy sheets, and cleaning of residual toner thereon, the improvement comprising;

a. a plurality of developing electrodes disposed along the path of movement of said surface in opposing relation thereto at a developing station.

b. means for supplying the developing agent between said electrodes and said surface,

c. voltage source means for providing a constant voltage source for said electrodes,

d. means for distributing the supplied voltage from said source means to said respective electrodes in a graded manner which substantially conforms to that of a reference damping characteristic of potential on said surface along the path of movement thereof at the developing station, and

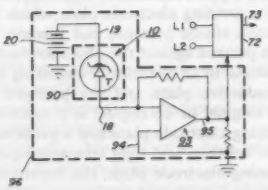
e. means for varying the values of voltages applied to said respective electrodes without influence to said graded manner therebetween in accordance with the value of potential of an electrostatic latent image on said surface to be developed.

4,021,112

PHOTORECEPTOR DARK CURRENT LEAKAGE DETECTING APPARATUS FOR XEROGRAPHIC MACHINES

Charles D. Wilson, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 23, 1975, Ser. No. 589,213
Int. Cl.² G03G 15/00
U.S. Cl. 355—14 5 Claims



1. In a xerographic type reproduction machine including a housing with a movable photoreceptor together with process

means to produce copies xerographically therewithin, said process means including charging means to place a uniform charge on said photoreceptor, exposure means for producing a latent electrostatic image of the original being copied, and developing means to develop the latent electrostatic image produced on said photoreceptor, said developing means including at least one biasable developer element, the combination of:

a. a test device disposed within said housing, said device comprising a miniature photoreceptor;

b. means for placing a preset voltage across said device; and

c. control means for regulating voltage input to at least one of said charging means and said developer element in response to changes in current through said device, said current changes being produced by temperature variations within said machine housing.

4,021,113

CLEANING DEVICE FOR ELECTROSTATIC COPIERS

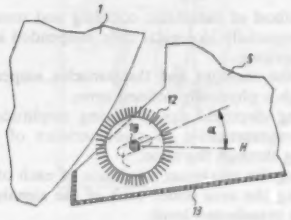
Walter Zindikus, Munich; Heinz Kröbel, Taufkirchen, and Walter Franke, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Feb. 17, 1976, Ser. No. 658,604

Claims priority, application Germany, Feb. 19, 1975, 2507151

Int. Cl.² G03G *21/00*

U.S. Cl. 355—15 **7 Claims**



7. In an electrostatic copier wherein an electrostatic image pattern is formed in the photoconductive surface of a rotatable endless carrier, toner and toner carrier particles are attracted to said pattern to form a visible image and are thereupon transferred to an image carrier and cleaning means subsequently contacts a portion of the photoconductive surface to clean it in preparation for the formation of another image pattern, the improvement comprising a brush roller having an axis of rotation extending parallel to the axis of rotation of said endless carrier, said brush roller engaging said surface upstream of said portion as considered in the direction of rotation of said endless carrier and being rotated exclusively by frictional contact with said surface so as to remove from said surface carrier particles adhering thereto and prevent them from reaching said cleaning means.

4,021,114

FILM STRIP CONTROLLER

James A. Millett, Fountain Valley, Calif., assignor to Lure Camera Ltd., Vancouver, Canada

Filed Jan. 26, 1976, Ser. No. 652,079

Int. Cl.² G03B *27/52*

U.S. Cl. 355—41 **9 Claims**

1. A film strip controller for use with a commercially available photographic printing apparatus to make the photographic printing apparatus compatable with non-perforated film strips, the film strip controller comprising:

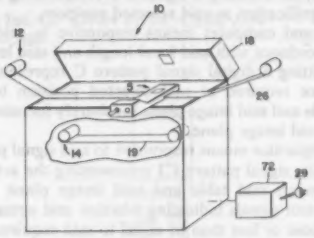
a housing with attaching means for connecting said housing to a commercially available photographic printing apparatus;

said housing having a film strip guide therein and an aperture therethrough for registering negatives of a film strip in said film strip guide;

magnetic brake means operable to clamp said film strip in said film guide;

brake circuit means connected to said magnetic brake means and responsive to an electrical signal to operate said brake means;

photosensitive control means mounted in said aperture along one edge of said film strip guide having at least two spatially separated photosensitive detectors arranged to have the light intensity incident thereon controlled by



marks on the edge of a film strip passing through said film strip guide; and

circuit means responsive to said photosensitive detectors having a first circuit operable to generate an electric signal to operate said brake circuit means when a specific pattern of marks is detected, and a second circuit responsive to an input signal to disable said first circuit; whereby said film strip is stopped by said magnetic brake means until said second circuit receives an input signal indicating the necessary printing exposure is complete.

4,021,115

REPRODUCTION CAMERA

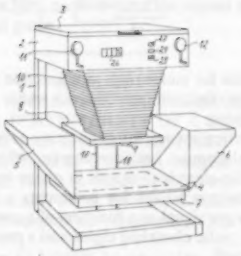
Erling F. Jeppesen, Birkeroed, Denmark, assignor to Oce-van der Grinten N.V., Venlo, Netherlands

Filed June 17, 1975, Ser. No. 587,539

Claims priority, application Netherlands, June 28, 1974, 7408750

Int. Cl.² G03B *27/34, 27/40*

U.S. Cl. 355—56 **5 Claims**



1. A reproduction camera including a frame having means to hold light-sensitive material in an image plane, a table for holding an original to be reproduced, a lens holder having a lens mounted therein for projecting onto said image plane a magnified image of an original exposed on said table, separate hand-operable means respectively for displacing said lens holder relative to said image plane and for displacing said table relative to said image plane, and means for indicating to a camera operator upon the setting of said lens in any selected position the relation of the actual position of said table to the position thereof required for sharply focusing said image in said image plane, said indicating means including

a. first signal forming means operative according to the positions of said lens holder to form digital signal patterns

X respectively corresponding to distances between said lens and said image plane,

b. second signal forming means operative according to the positions of said table to form digital signal patterns C1 respectively corresponding to distances between said table and said image plane,

c. first computer means responsive to the signal pattern X formed at any selected position of said lens holder, in accordance with the focal length and the length of said lens, for emitting a signal S corresponding to the image magnification at said selected position,

d. second computer means responsive to said signal S in accordance with said focal length and said lens length for emitting a digital signal pattern C representing the distance required at said selected position between said table and said image plane for sharply focusing said image in said image plane,

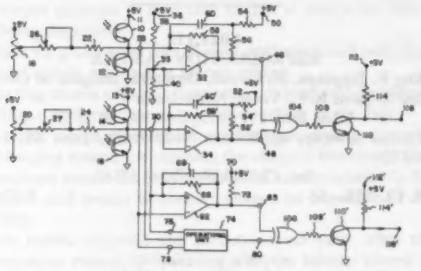
e. comparator means responsive to said signal pattern C and to the signal pattern C1 representing the actual distance between said table and said image plane for emitting control signals indicating whether said actual distance is greater or less than or equal to said required distance,

f. and means for visibly displaying to the operator the relative table position indicated by said control signals.

4,021,116
HIGH RESOLUTION DISTANCE MEASURING APPARATUS

Alexander E. Martens, Fairport, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,862
Int. Cl.² G01C *3/08*
U.S. Cl. 356—4 **4 Claims**



1. Apparatus for measuring, as a function of impulse counting, a relative displacement distance value between two objects, comprising:

photodetection means for generating as a function of relative displacement between the two objects first and second cyclic electrical signals in phase quadrature;

first comparison means for producing a first substantially square wave signal as a function of a comparison between the first cyclic electrical signal and a predetermined reference signal;

second comparison means for producing a second substantially square wave signal as a function of a comparison between the second cyclic electrical signal and the predetermined reference signal;

third comparison means for generating a third substantially square wave signal as a function of a comparison between the first and second cyclic electrical signals;

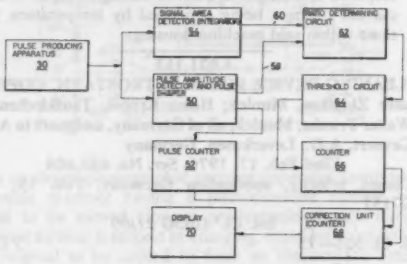
operational means for producing a fourth substantially square wave signal as a function of when the first cyclic electrical signal has a value which is equal in magnitude and opposite in sign to the value of the second cyclic electrical signal; and

logic means receiving tne first, second, third and fourth substantially square wave signals produced as a function of the first and second cyclic electricai signals to provide an impulse train signal corresponding to the relative displacement distance value between the objects.

4,021,117
PROCESS FOR AUTOMATIC COUNTING AND MEASUREMENT OF PARTICLES

Hildegard Göhde, and Wolfgang Göhde, both of v.-Stauffenberg-Str. 40, 4400 Munster, Germany

Filed Aug. 7, 1975, Ser. No. 602,750
Int. Cl.² G01N *33/16, 27/00*
U.S. Cl. 356—39 **5 Claims**



1. A method of automatic counting and measurement of particles, especially biological cells, suspended in a fluid medium, comprising

passing the medium and the particles suspended therein through a physically defined zone;

producing electrical signals having amplitudes and durations representative of characteristics of the particles passing through the zone;

measuring the maximum amplitude of each of the signals;

measuring the area under each of the signals and greater than a preselected level;

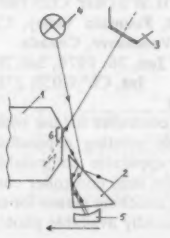
determining the ratio of the measurements of maximum amplitude to area; and

identifying those signals for which the ratio exceeds a predetermined value as being indicative of the coincidental passage of more than one particle through said zone.

4,021,118
METHOD IN A MICROTOME FOR APPROACHING THE KNIFE TO THE SPECIMEN

Anton Soderkvist, Vallingby, and Hans Lycke, Bromma, both of Sweden, assignors to LKB-Produkter AB, Bromma, Sweden

Filed Mar. 29, 1976, Ser. No. 671,370
Claims priority, application Sweden, Apr. 10, 1975, 7504111
Int. Cl.² G01N *1/06*
U.S. Cl. 356—156 **3 Claims**



1. A method in a microtome where a glass knife is used to cut off sections from a sample by means of making the sample

pass the knife, the method being used for bringing the knife close to the sample before the cutting process is initiated, characterized in, that the surface of the knife remote from the specimen is lit up from below whereby the lit up surface of the knife will generate a reflected image in the upper part of the surface of the specimen close to the knife, whereas below this image a dark area is obtained the width of this dark area constituting a measure of the distance between the knife edge and the specimen surface.

4,021,119

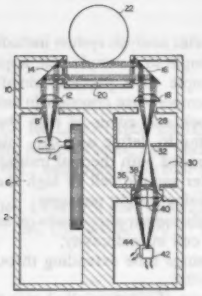
POSITION GAUGE

Norman L. Stauffer, Englewood, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed June 24, 1975, Ser. No. 589,939

Int. Cl.² G01B *11/10*

U.S. Cl. 356—159 **4 Claims**



1. An optical gauging means comprising a housing member,

means defining a plurality of compartments within said housing member,

a light source means mounted in a first one of said compartments,

means within said housing member for defining a first and a second effective beam of light from said light source means,

means for directing said first and second effective beams of light from said first compartment through a second one of said compartments and into a third one of said compartments,

a first and a second electrically responsive photodetector mounted within said third compartment, said first photodetector being position to be responsive to said first beam of light and said second photodetector being positioned to be responsive to said second beam of light,

means defining a channel across said second compartment and transverse said first and second light beams, said channel being adapted to receive an object to be gauged therein a position to partiallly interrupt said first light beam, said second light beam comprising a reference beam,

means differentially responsive to output signals from said first and second photodetectors as a measure of the gauging of said object,

said means for defining said first and second light beams including a lens system for producing light in substantially parallel rays across said channel,

said lens system forming an image of said light source means within said third compartment and being characterized by the inclusion of an aperture plate within said third compartment at the position of said image of said light source means whereby to effectively exclude extraneous light.

4,021,120

METHOD OF MEASURING THE TURBIDITY OF GAS-CONTAINING LIQUID MEDIUMS WITH MICROORGANISMS

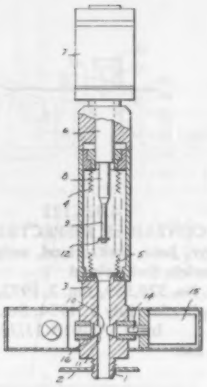
Hans Muller, Mannedorf, and Werner Stumpp, Stafa, both of Switzerland, assignors to Dr. Ing. Hans Mueller, Erlenbach, Zurich, Switzerland

Division of Ser. No. 559,156, March 17, 1975, Pat. No. 3,962,041. This application Dec. 16, 1975, Ser. No. 641,186

Claims priority, application Switzerland, Mar. 18, 1974, 3809/74

Int. Cl.² G01N *21/26*; C12K *1/04*

U.S. Cl. 356—208 **2 Claims**



1. A method of measuring the turbidity of gas-containing liquid mediums with microorganisms, comprising the steps of establishing a fluid-communication path between a vessel and a measuring chamber; drawing a sample of the medium from said vessel into said measuring chamber; measuring the turbidity of the drawn sample outside said vessel after gas bubbles in the drawn sample have escaped from it; thereafter reintroducing the drawn sample from said measuring chamber into said vessel; and thereafter sterilizing said vessel, said path and said measuring chamber simultaneously and together prior to introduction of the new medium into the vessel and without interruption of said paths.

4,021,121

METHOD AND APPARATUS FOR MEASURING THE DISTANCE OF A DISCONTINUITY OF A GLASS FIBER FROM ONE END OF THE FIBER

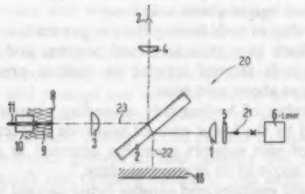
Dieter Schicketanz, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 29, 1975, Ser. No. 626,826

Claims priority, application Germany, Oct. 30, 1974, 2451654

Int. Cl.² G01N *21/16, 21/32*

U.S. Cl. 356—237 **5 Claims**



1. An apparatus for measuring the interval of a discontinuity

in a glass fiber from one end of the glass fiber comprising means for releasably holding a glass fiber in a guideway, a coated quartz plate being disposed in front of one end of the glass fiber to provide a gap therebetween, an immersion fluid filling said gap, a laser for producing light pulses directed at said one end of the glass fiber, means for sensing a light pulse, means for coupling the light pulse from the pulse laser through the quartz plate and immersion fluid into said one end of the fiber, said means for coupling directing a reflected pulse into said means for sensing, and means for measuring the time delay between the coupling of a light pulse from the laser into said one end of the fiber and the sensing of the reflected light pulse so that the distance of the discontinuity from said one end can be determined.

4,021,122

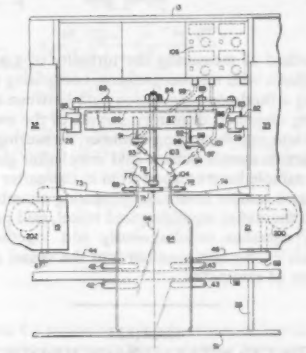
GLASS CONTAINER INSPECTION MACHINE

Willy Krenmayr, Jona, Switzerland, assignor to Emhart Zurich S.A., Zurich, Switzerland

Division of Ser. No. 320,569, Jan. 2, 1973, Pat. No. 3,848,742. This application July 1, 1974, Ser. No. 484,709

Int. Cl.² G01N *21/32*

U.S. Cl. 356—240 **2 Claims**



1. In a glass container inspection machine of the type having an inspection station and means for rotating each container on a fixed base and on a fixed reference axis at such station the improvement comprising:

a. an inspection head for a plurality of light emitter and sensor means for said inspection station;

b. means for supporting said light emitters and sensors in said inspection head, said supporting means including;

c. a molded block of plastic material supported at a predetermined height above said base;

d. a plurality of rods having their upper ends embedded in said block in a predetermined pattern, and having the lower ends thereof located at various predetermined distances above said base;

e. a plurality of horizontally extending support members carried by the lower ends of said rods respectively and

f. each of said support members oriented at a predetermined angle in its horizontal plane,

g. said light emitters and sensors being carried by said support members in spaced relation to said rods and at predetermined angles with respect to said rods.

4,021,123

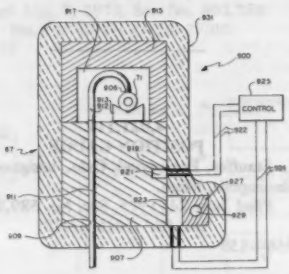
HEAT EXCHANGER FOR ANALYSIS APPARATUS

John G. Atwood, Redding, and Charles F. Demey, II, W. Redding, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 499,853, Aug. 22, 1974, abandoned. This application Jan. 22, 1976, Ser. No. 651,542

Int. Cl.² G01N *21/26, 1/10*

U.S. Cl. 356—244 **6 Claims**



1. In a photometer analysis system including means to transfer a reaction sample to a sample cell, apparatus for bringing the reaction sample to a predetermined temperature and maintaining its temperature constant in said cell comprising:

a. a metal block and cover of high thermal conductivity metal coacting to define a cavity, said cover and block being surrounded with thermal insulation;

b. a photometer sample cell of high thermal conductivity metal containing a sight passage;

c. thermal-insulation support means on said block mounting said sample cell in said cavity;

d. a heat exchange tube extending through said block and into said cavity;

e. conduit means of substantially lower thermal conductivity than said heat exchange tube interconnectng said sight passage with said heat exchange tube to thermally isolate the cell from said metal block; and

f. temperature regulation means for maintaining said block at a substantially constant predetermined temperature.

4,021,124

VESSELS FOR THE OPTICAL OBSERVATION OF LIQUIDS

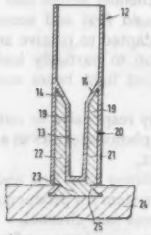
Walter Sarstedt, Numbrecht, Rommelsdorf, Germany, assignor to Kunststoff-Spritzgusswerk, Germany

Filed Feb. 25, 1976, Ser. No. 661,084

Claims priority, application Germany, Feb. 27, 1975, 2508527

Int. Cl.² G01N *1/10*

U.S. Cl. 356—246 **7 Claims**



1. Vessel means for the optical observation of small quantities of liquids, said vessel comprising a vessel body having a bottom and four side walls which extend upwardly therefrom,

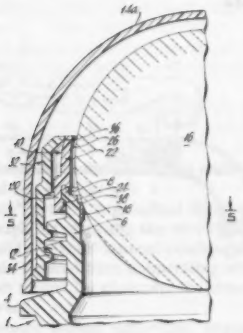
two opposite ones of said side walls defining transparent and planar end walls which extend parallel to one another and which have outer surfaces located at a predetermined distance apart and the other two of said side walls being spaced apart by a distance less than said predetermined distance in order to reduce the quantity of liquid required for examination, and each having an outer surface on which are defined two ribs which extend parallel to the transparent end walls, each two mutually aligned ones of said ribs having edges which are spaced the said predetermined distance apart, and a generally U-shaped thermally conductive body defining limbs, each limb occupying a space between two respective ribs and having an inwardly facing side which abuts against a respective one of said other side walls, said U-shaped body also defining a bridge portion interconnecting said limbs and extending below said bottom, said bridge portion being adapted to releasably fix the vessel to a heating device.

4,021,125

BALL ROLL-ON DISPENSER

Walter G. Berghahn, Scotch Plains, and Jack Weinstein, Old Bridge, both of N.J., assignors to Bristol-Myers Company, New York, N.Y.

Filed Oct. 17, 1975, Ser. No. 623,890
Int. Cl.² B43K 9/00
U.S. Cl. 401—213 **6 Claims**



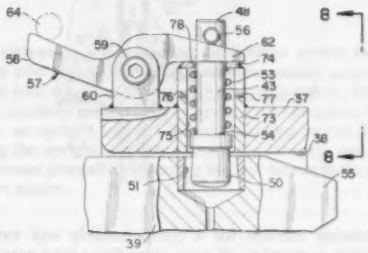
1. A dispensing device comprising a container having an open end defined by an annular wall, a generally spherical ball mounted within said open end, a plurality of relatively small nibs extending inwardly from said annular wall and adapted to support said ball for rotation; the relative dimensions of said nibs and the relative diameters of said ball and annular wall being such as to form a first restricted passage of less than 0.1 inches between said ball and annular wall adjacent said nibs for the flow of liquid product from within said container and to serve as a metering device for the flow of said liquid product, a relatively thin resilient retaining ring surrounding said ball adapted to retain said ball inside said open end; said ring being in engagement with the outside of said annular wall, at least a portion of the internal surface of said retaining ring forming a second restricted passage between said ball and said retaining ring for the flow of liquid product contained within said container; a portion of the internal surface of the retaining ring being adapted to serve as a circumferential sealing surface against said ball.

4,021,126

LATCH MECHANISM FOR AUGER STRING COUPLINGS

Ronald C. Deeter, Malvern; Thad A. Lora, and John M. Pozniko, both of Salem, all of Ohio, assignors to The Salem Tool Company, Salem, Ohio

Continuation-in-part of Ser. No. 521,637, Nov. 7, 1974, Pat. No. 3,967,909. This application Sept. 18, 1975, Ser. No. 614,625
Int. Cl.² F16D 7/00
U.S. Cl. 403—9 **11 Claims**



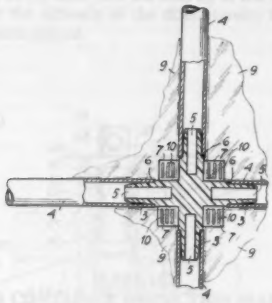
8. A latching device for securing in endwise coupled relation socket means and mating shank means of auger sections, said socket means having a surrounding wall having an exterior, said latching device comprising: means defining a passage extending transversely through said surrounding wall of said socket means; retainer means at the outer end of said passage adjacent the outer surface of said wall of said socket means; a latch pin extending through said passage and having an actuating end portion projecting outwardly through said retainer means, retractor means on said actuating end portion of said latch pin outside of said passage, and an opposite latching end portion, said latch pin being movable between an extended latching position in which its latching end portion is in latching engagement with said shank means and a retracted unlatching portion in which its latching end portion is disengaged from said shank means, said latch pin having a transverse shoulder thereon that approximates in cross section the cross section of said passage and that is located on said latch pin so it is fixed on said latch pin adjacent its latching end portion and also so said shoulder is positioned in said passage a substantial distance away from said retainer means when said latch pin is in its retracted position to provide a clearance portion of said passage; means for biasing said latch pin toward its said extended latching position; means mounted on said socket means and having pin-engaging means adapted to engage said retractor means and move said latch pin against the force exerted by said biasing means to its said retracted unlatching position; and opening means communicating with said exterior of said surrounding wall of said socket means at a location adjacent to said passage and with the interior of said passage at a location in said clearance portion of said passage, to permit debris in said passage to be pushed by said shoulder into said clearance portion of said passage and out of said passage through said opening means to said exterior of said surrounding wall of said socket means by said shoulder means as said latch pin is moved to its said retracted unlatching position.

4,021,127

JOINTING ELEMENT FOR A COMPOUNDABLE UNIT STRUCTURE, AND A STRUCTURE USING SAID JOINTING ELEMENT

Luigi Gasparro, Via Coronelli, 6, and Luciano Brunetti, Via Tito Vignoli, 27, both of Milan, Italy

Filed Feb. 10, 1976, Ser. No. 656,930
Int. Cl.² F16B *13/00*
U.S. Cl. 403—171 1 Claim



1. Jointing element for a compoundable unit structure, comprising a plurality of pegs extending along axes which intersect perpendicularly at one point, the pegs being joined together in proximity to the point of intersection of said axes and having their ends dimensioned such that they may be inserted into support tubes; and a plurality of seats in the intersection and joining region of the pegs arranged to accomodate the corners of panels disposed substantially coplanar to the planes defined by said axes, the seats being dimensioned such that the edges of the panels come into direct contact with said support tubes, wherein the seats are defined by enlargements projecting from portions of the pegs which are closest to the joining region but which are not involved in the mounting of said support tubes, wherein said enlargements consist of walls which extend substantially flatly, parallel to the faces of said panels, wherein pairs of said walls disposed mutually parallel are provided for positioning a vertical panel, in such a manner that they clamp one corner of said panel from opposite sides, while a single substantially horizontal wall is provided for positioning a horizontal panel, and on which said horizontal panel rests at one of its corners, and wherein each of said pairs of walls arranged to clamp the corner of a vertical panel are provided with deformable ribs to create a seat into which a panel corner is inserted by forcing.

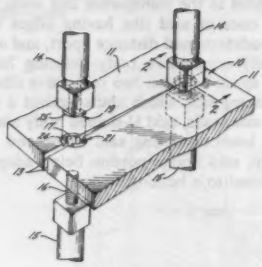
4,021,128

JOINT STRUCTURE FOR MODULAR SHELF ASSEMBLY

George J. Chiames, Arlington Heights, Ill., assignor to Newell Companies, Inc., Freeport, Ill.

Filed Nov. 3, 1975, Ser. No. 627,847
Int. Cl.² A47B *96/00*
U.S. Cl. 403—217 4 Claims

1. A joint structure for supporting first and second coplanar shelves of a modular shelf system in abutting edge-to-edge engagement with each other, said structure including a lower support having an upper end abutting the underside of said first and second shelves across the abutting edges of said shelves, an upper support abutting the upper side of said first and second shelves and being in axial alignment with said lower support, a hole concentric with the axis of said supports and extending vertically through said shelves, fastening means extending through said hole and between said upper and lower supports for clamping said supports against said shelves, an annular recess concentric with said hole and being formed in said shelves on one side thereof, said recess having a predetermined diameter and a cup-shaped bottom surface curved convexly in a direction progressing outwardly and away from said shelves, and an annular boss formed on the end of the one of said supports which is adjacent said one side of the shelves, said boss having a diameter less than the diameter of said recess, and an inverted, cup-shaped, outer end surface corresponding to the shape of said bottom surface, said boss being telescoped into said recess with said outer end surface abutting said bottom surface so as to hold said shelves against edgewise separation and with the end of said one support being spaced from said one side of the shelves to assure proper seating of said boss within said recess.

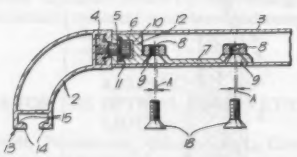


4,021,129

MECHANICAL CONNECTIONS BETWEEN ADJACENT MEMBERS

Christopher C. Sykes, London, England, assignor to Nexus Manufacturing Limited, Great Britzin

Filed Jan. 12, 1976, Ser. No. 648,564
Int. Cl.² F16B *12/44*
U.S. Cl. 403—252 7 Claims



1. A joint assembly comprising:
i. a connector including:
   a. a head;
   b. a tongue portion extending away from said head;
   c. means defining first engagement surfaces on said head, said first engagement surfaces diverging towards and being orientated at an acute angle to said tongue portion;
   d. a ramp surface on said tongue portion;
   e. means defining a screw threaded hole at the base of said ramp surface; and,
   f. clamping means,
ii. a clamping device operatively cooperating with said clamping means;
iii. a channel-shaped member including:
   a. a pair of lips extending along said channel-shaped member, said lips being directed towards one another to define slot means therebetween and,
   b. means defining second engagement surfaces on said

lips, said second engagement surfaces being inclined at a corresponding inclination to said first engagement surfaces; said head of said connector being located in said channel-shaped member with the remainder of said connector issuing through said slot means and with said first and second engagement surfaces being urged into locking contact with each other by said clamping device, whereby said inclination of said first and said second engagement surfaces prevents said lips splaying apart;

iv. a hollow rail including:

a. means defining a hole in said rail; said tongue portion being received in said hollow rail and said hole in said rail being offset from said screw threaded hole in said tongue portion in a direction longitudinally of said rail and away from said head, and

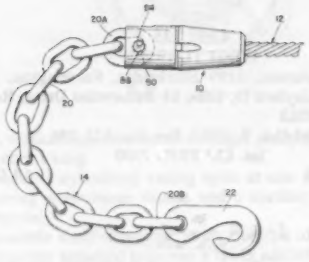
v. a counter-sunk headed bolt inserted through said hole in said hollow rail and into said screw threaded hole, whereby tightening of said counter-sunk headed bolt in combination with said offset holes and said ramp surface causes said hollow rail to move towards said channel-shaped member to tighten said joint.

4,021,130

CHAIN TO WIRE ROPE CONNECTOR

Edward J. Crook, Jr., Tulsa, Okla., assignor to American Hoist & Derrick Company, Tulsa, Okla.

Filed July 11, 1975, Ser. No. 595,098
Int. Cl.² B25G *3/28*
U.S. Cl. 403—275 **5 Claims**



1. A connector device for connecting multi-strand wire rope to a chain and comprising,

socket means having a longitudinal tapered bore extending therethrough for receiving the wire rope therethrough,

a unitary solid wedge of tapered configuration complimentary to said tapered bore cooperating with the wire rope and socket means for clamping the strands of wire rope therebetween,

chain connector means removably engagable with said socket means to force said chain against said wedge in said clamping and assembled position,

longitudinally extending engagement means provided on one end of said wedge and accessible upon removal of connector means for facilitating removal of said wedge from said socket means,

locking means for locking said connector means in said assembled position.

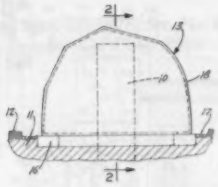
4,021,131

COVER ASSEMBLY

Kenneth W. Bakken, 20615 Akin Road, Farmington, Minn. 55024, and David G. Larson, 8008 67th Ave. N., Minneapolis, Minn. 55428

Filed Dec. 31, 1975, Ser. No. 645,877
Int. Cl.² E02D *29/10*
U.S. Cl. 404—25 **26 Claims**

22. A cover assembly for an object located on a support, as the ground, comprising: a housing having a chamber and an open bottom, said chamber being of a size to accommodate the object, a support base located on the support adjacent the object, and hinge means connected to the housing and the support base, said hinge means anchoring the housing to the support base and allowing the housing to be moved from a closed position wherein the housing covers the object to an open position wherein the object is exposed to the environ-



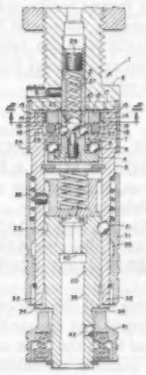
ment surrounding the housing, said hinge means including upright post means, fastening means releasably securing the upright post means to the support base, link means, first pivot means pivotally connecting the upright post means to the link means, an upright support means, fastening means for connecting the upright support means to the housing, and second pivot means pivotally connecting the link means to the upright support means.

4,021,132

FLOATING TOOL HOLDER

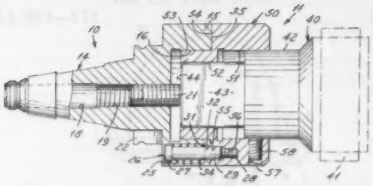
Milton Lloyd Benjamin, and Wilbur Nelson Miles, both of Chagrin Falls, Ohio, assignors to Erickson Tool Company, Solon, Ohio

Filed May 19, 1976, Ser. No. 688,090
Int. Cl.² B23B *39/10, 5/22, 5/34*
U.S. Cl. 408—127 **10 Claims**



1. A floating tool holder comprising a shank member; a tool supporting member; a drive plate assembly between said member for transmitting torque from said shank member to said tool supporting member while permitting lateral floating movement of said tool supporting member in a perpendicularly-related directions; and a retainer secured centrally within said shank member and having a radially outwardly extending flange which radially overlaps a radially inwardly extending flange of said supporting member to retain said members against axial separation.

4,021,133
TAP DRIVER APPARATUS
Gary R. Ebert, Dearborn, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.
Filed Apr. 16, 1975, Ser. No. 568,804
Int. Cl.² B23G 3/06
U.S. Cl. 408—141 **1 Claim**



1. An axially extending tap drive apparatus comprising a tap holder assembly comprising a housing having a rearward portion adapted to be gripped in a tool holder and having a forward portion provided with a centrally disposed opening, a threaded opening positioned rearwardly and centrally of said opening and communicating therewith, a bolt threadably and adjustably positioned in said threaded opening, a tap assembly comprising a bushing and a tap head, said bushing having an opening extending throughout its length and having a stepped portion on the exterior surface thereof, said stepped portion engaging the forward portion of said housing to thereby align the housing and bushing with respect to each other while limiting the inward movement of the bushing, said tap head being positioned in said bushing and having one end extending into said bushing opening and engaging said adjustably positioned bolt to limit its inward movement and axially position said tap head with respect to said housing, a bit adapted to be secured to the other end of said head, means removably securing said tap head in said bushing, securing means mounting said tap assembly to said tap holder assembly and permitting a limited linear movement of one with respect to the other, said securing means including a plurality of bolts located in aligned bores disposed parallel to said axis and positioned in said housing and bushing, respectively, for maintaining the same in alignment, and resilient means positioned about each of the bolts and being compressible when said bolts are urged into said aligned bores whereby said tap head and said bushing rotate in unison but more axially away from said holder when said bit is drawn into a work piece.

4,021,134
EXTRUSION DIE AND CUTTING TOOL FOR MACHINING SUCH A DIE
Charles L. Turner, Delran, N.J., assignor to General Refractories Company, Philadelphia, Pa.
Division of Ser. No. 356,357, May 2, 1973. This application Nov. 4, 1975, Ser. No. 628,754
Int. Cl.² B23B 41/02; B26D 1/12
U.S. Cl. 408—204 **6 Claims**

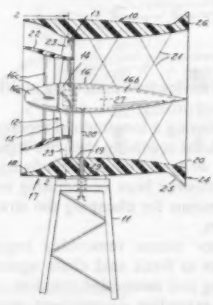
1. A hollow mill cutting tool capable of forming a plurality of closely spaced cylindrical pins on one face of a plate member by removing material from the plate member, comprising: a generally cylindrical member terminating in a tip portion having a toroidal cross-section adjacent said cylindrical member and said tip portion having its axis aligned with said cylindrical member, the inside diameter of said tip portion selected to be the desired diameter of the cylindrical pin, said tip portion including

a. a plurality of forward helical surfaces that each terminate at their forward end in a cutting edge, each said helical surface extending rearwardly along a cylindrical path from said cutting edge at an angle of from 9° to 11° with a plane transverse of said axis;

b. a plurality of back helical surfaces, each of said back helical surfaces adjacent its rearward end being inclined at an angle of at least 55° to a plane parallel to said axis, each of said forward helical surfaces being connected to one of said back helical surfaces; and

c. a plurality of generally longitudinally-extending surfaces, with each of said longitudinally-extending surfaces connected at one end to the forward end of one of said forward helical surfaces to form one of said cutting edges, and the other end of each of said longitudinally-extending surfaces connected to the rear end of an adjacent back helical surface.

4,021,135
WIND TURBINE
Nicholas F. Pedersen, 3199 Sturbridge, Farmington, Mich. 48024, and Gaylord O. Ellis, 61 Bellarmine Drive, Rochester, Mich. 48063
Filed Oct. 9, 1975, Ser. No. 621,036
Int. Cl.² F03D 7/00
U.S. Cl. 415—2 **14 Claims**



1. In a wind turbine, a reaction turbine comprising blades for receiving the wind and deriving power therefrom and augmenter means for producing a vortex downstream of the turbine at the exit of the turbine,

said augmenting means comprising a plurality of fixed blades in the path of the wind,

a first cowling surrounding the turbine, said vortex augmenting means surrounding said cowling,

a second cowling surrounding said augmenting means,

said blades of said augmenting means extending between said cowlings,

said blades of said augmenting means being angularly related with respect to the axis of the wind turbine in the same direction as the blades of the reaction turbine,

said cowling surrounding said augmenting means including an inlet, a central portion and an outlet defining a venturi,

said reaction turbine being adjacent said central portion of the second cowling,

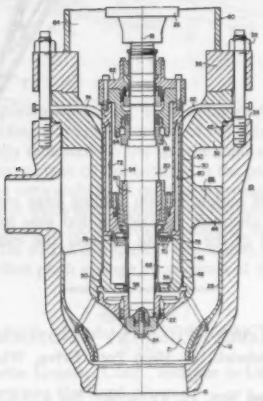
said second cowling extending substantially from the inlet to the turbine in spaced relationship to the first-mentioned cowling.

4,021,136

CENTRIFUGAL PUMP

Frank Sabino, Jr., Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 11, 1976, Ser. No. 656,994
Int. Cl.² F04D *29/10*
U.S. Cl. 415—111 5 Claims



1. A vertically positioned centrifugal pump for circulating a liquid comprising:

a generally cylindrical casing open at one end, said casing having a discharge nozzle and a suction nozzle formed therein;

a rotatable shaft extending along the axis of said casing;

an impeller attached adjacent a lower end of said shaft, said impeller being generally positioned in the path between said suction nozzle and said discharge nozzle;

a generally cylindrical axially extending outer shell positioned within said casing and coaxial with said casing, said outer shell having a flange extending radially outwardly from the upper periphery thereof, said outer shell flange being secured to the top of said casing, said casing, said outer shell, and said outer shell flange forming an area therebetween through which said liquid to be circulated flows;

a generally cylindrical axially extending inner shell positioned within said outer shell and coaxial with said outer shell, said inner shell having an outwardly radial extension around the lower portion thereof, said inner shell being hermetically secured to said outer shell at said inner shell radial extension, said inner shell at the upper portion thereof being spaced apart from said outer shell flange, said inner shell and said outer shell forming an annular first space therebetween, in open communication with the exterior of said casing, said inner shell and said shaft forming an annular second space therebetween;

a bearing assembly secured to said inner shell in said second space, said bearing assembly rotatably receiving said shaft;

means for sealing said second space secured to said inner shell, said means for sealing said second space being positioned vertically above said bearing assembly, said means for sealing said second space receiving said shaft; and

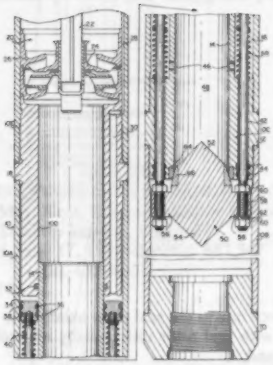
an annular cooler positioned within said second space vertically below said bearing assembly, said cooler rotatably receiving said shaft.

4,021,137

STORM CHOKE APPARATUS FOR SUBMERGIBLE PUMPS

James N. Zehren, Bartlesville, Okla., assignor to TRW Inc., Cleveland, Ohio

Filed Sept. 24, 1975, Ser. No. 616,321
Int. Cl.² F04D *25/00*
U.S. Cl. 415—147 11 Claims



1. Storm choke apparatus for use with submergible pump means, comprising a tubular housing associated with said pump means and adapted to be submerged in a fluid to be pumped therethrough, said housing having a longitudinal fluid flow passage therethrough with a circumferential valve seat, an axially reciprocating valve member which, when in a closed position, engages said seat and isolates a space in said housing at one side of said member from a space at a different side of said member, operating means coupled to said valve member and responsive to differential pumping pressure across said pump means for moving said valve member to an open position away from said seat for providing communication between said spaces, and means coupled to said valve member for moving said valve member to said closed position in the absence of said differential pumping pressure, said different side of said valve member being exposed to said fluid to be pumped and responding to the pressure thereof, when said valve member is in closed position, for holding said valve member in said closed position more tightly, said operating means comprising piston means supported for reciprocation in chamber means located laterally outward of said longitudinal passage, said piston means having a plurality of rods extending axially of said housing at opposite sides of said passage, connected to said piston means at one end thereof, and connected to said valve member at the opposite end thereof.

4,021,138

ROTOR DISK, BLADE, AND SEAL PLATE ASSEMBLY FOR COOLED TURBINE ROTOR BLADES

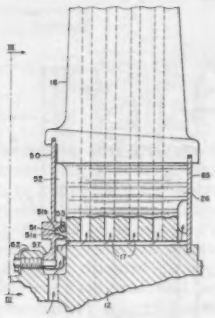
Augustine J. Scalzo, Philadelphia, and Richard P. Gun[illegible]rlock, Chester Township, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 3, 1975, Ser. No. 628,450
Int. Cl.² F01D *5/18*
U.S. Cl. 416—95 4 Claims

1. A rotor disk, blade, and seal plate assembly for an axial flow fluid machine wherein said assembly defines a sealed cooling fluid chamber between the root of said blade and said

disk, and wherein said blade is mounted in said disk through a fir-tree blade root configuration defining a series of projections which under centrifugal force engage complimentary projections on said disk to provide a plurality of sealing engagements therebetween along the axial extent of said disk and said blade and first sealing means sealing said chamber radially inwardly of said blade root, and second sealing means for sealing said chamber radially outwardly of said first sealing means;

said first sealing means comprising complementary angled surfaces on said disk and said seal plate whereby centrifugal force moves the seal plate axially into sealing engagement with said rotor disk radially inwardly of said blade root; and,



said second sealing means comprises means on said seal plate defining a camming surface facing said adjacent rotor disk and blade root and movable means disposed adjacent said camming surface for engagement therewith under the influence of centrifugal force to be moved axially into sealing engagement between said surface and said rotor disk and blade root radially outwardly but closely adjacent the radially innermost point of said plurality of sealing engagements.

4,021,139

GAS TURBINE GUIDE VANE

Clifford John Franklin, Winterthur, Switzerland, assignor to Brown Boveri Sulzer Turbomachinery, Ltd., Zurich, Switzerland

Filed Oct. 30, 1975, Ser. No. 627,367

Claims priority, application Switzerland, Nov. 8, 1974, 14952/74

Int. Cl.² F01D *5/18*

U.S. Cl. 416—97 R **7 Claims**

1. A gas-turbine guide vane comprising

a jacket disposed on a longitudinal axis and defining a leading edge, a trailing edge, an internal wall defining a hollow cavity, a pressure side and a suction side;

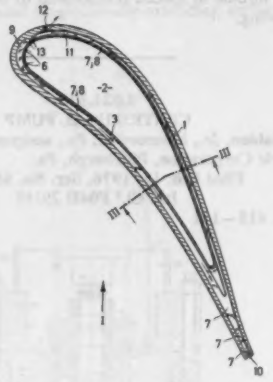
a hollow insert in said cavity disposed in spaced relation to said wall to define an air chamber therein and a turbulence space between said insert and said jacket at said leading edge;

a partition extending between said insert and said wall parallel to said axis at said leading edge on one side of said turbulence space;

a plurality of openings in said insert at said leading edge communicating said air chamber with said turbulence space;

a plurality of projections on said wall extending from said turbulence space toward said trailing edge on said pressure side to define air flow channels and from said trailing edge towards said partition on said suction side to define air flow channels;

a plurality of outlets in said trailing edge communicating with said channels on said pressure side to exhaust a portion of cooling air; and



a plurality of outlets in said leading edge communicating with said channels on said suction side to exhaust the remainder of the cooling air over the exterior of said jacket.

4,021,140

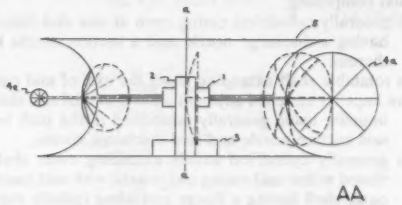
VARIABLE GEOMETRY WINDTURBINE

Alfred L. Weisbrich, 86 High Path Drive, Windsor, Conn. 06095

Filed Nov. 12, 1974, Ser. No. 523,028

Int. Cl.² F03D *3/04*

U.S. Cl. 416—117 **11 Claims**



1. A power generating device comprising:

fluid impact impellers for converting fluid energy into mechanical energy;

a fluid flow accelerator surface having an outer structure and a shape substantially that of a partial inner concentric section of a hollow toroid providing thereby open channel means about the exterior periphery of said fluid flow accelerator;

wherein said fluid impact impellers are mounted within said fluid flow accelerator channel means for the purpose of energy extraction from accelerated fluid velocity fields within said channel means.

4,021,141

SEMI-RIGID ROTORS FOR ROTARY WING AIRCRAFT

Kenneth Watson, Yeovil, England, assignor to Westland Aircraft Limited, Yeovil, England

Filed Aug. 25, 1975, Ser. No. 607,591

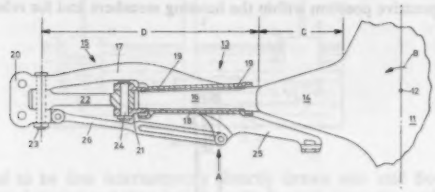
Claims priority, application United Kingdom, Sept. 6, 1974, 39109/74

Int. Cl.² B64C *27/38*

U.S. Cl. 416—141 **10 Claims**

1. For a rotary wing aircraft, a semi-rigid rotor including a

rotor hub arranged for rotation about a generally vertical axis and a plurality of rotor blades, each rotor blade being attached to the hub through flexure members comprising an inner part extending from the hub and being resiliently flexible in a plane perpendicular to the plane of rotation to accommodate rotor blade flapping movements during operation, and an outer part extending from the inner part for attachment of the rotor blade and being resiliently flexible in a plane coincident with the plane of rotation to accommodate rotor blade lead/lag



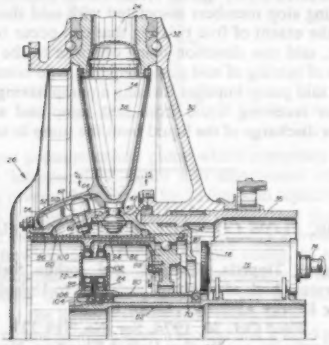
movements during operation, each outer part comprising a spindle extending from an outer end of the inner part, a housing rotationally mounted on the spindle, and an arm secured along an outer surface of the housing in the plane of rotation and extending outwardly to an outer end arranged for connection to the rotor blade and spaced-apart radially from an outer end of the spindle, a tie-bar interconnecting the outer end of the arm and the end of the spindle, and means for rotating the housing to effect pitch change movements of the rotor blade.

4,021,142

PITCH-CHANGE APPARATUS FOR A DUCTED THRUST FAN

John A. Violette, Granby, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Oct. 9, 1974, Ser. No. 513,323
Int. Cl.² B64C *11/32*
U.S. Cl. 416—167 **8 Claims**



1. A pitch-change apparatus for a ducted thrust fan having a plurality of variable pitch blades mounted on a fan hub for pivoting movement about the respective blade axes from forward pitch through feather to reverse pitch and return, said blades extending radially perpendicular from the hub axis, comprising:

a pitch-change ring mounted coaxially of the hub at an axially fixed station for rotation about the hub axis with the hub, and relative to the hub and the blades mounted thereon;

a plurality of pitch-change horns connected respectively to the plurality of variable pitch blades, one horn being connected with one blade for pivoting movement with the blade about the blade axis and projecting outwardly from the blade axis and arcuately downwardly toward the hub axis with a camming surface defined thereon, said camming surfaces extending substantially the entire length of the pitch-change horns and being generally aligned with the hub axis when the blades are in the feathered position; and

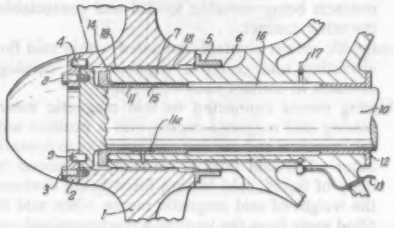
a plurality of camming means on the pitch-change ring at circumferentially spaced stations for rotational movement with the ring relative to the hub and blades about the hub axis, each of the plurality of camming means engaging the camming surfaces on an associated one of the pitch horns whereby said camming means are closest to said blades when the blades are in the feathered position and rotation of the pitch-change ring moves the camming means over the camming surfaces of the associated pitch-change horns and varies blade pitch.

4,021,143

MARINE PROPELLER ARRANGEMENT

Eric Raymond May, Kent, England, assignor to Stone Manganese Marine Limited, London, England

Filed June 17, 1975, Ser. No. 587,567
Int. Cl.² B63H *1/20*
U.S. Cl. 416—174 **1 Claim**



1. Support apparatus for a marine propeller having a propeller hub with a bore, comprising:

a propeller shaft having said propeller hub mounted on the aft end thereof;

a drive plate detachably secured to the aft ends of both said propeller and said propeller shaft;

a stern tube surrounding said propeller shaft and extending aft into said bore of said propeller hub, said stern tube having an outer diameter, said outer diameter being sufficiently smaller than said bore of said propeller hub to avoid contact of said tube with said bore in service;

at least an aft shaft bearing mounted inside said stern tube, said aft bearing being located with its geometrical center substantially coincident with the center of gravity of said propeller, said aft shaft bearing having oil pockets with pressurized fluid whereby said propeller can be supported on a fluid cushion prior to commencement of rotation and during low speed rotation; and

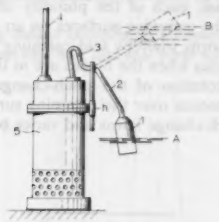
at least one inwardly projecting auxiliary bearing surface in said bore of said propeller on which the weight of said propeller can be supported on said outer diameter of said stern tube when said apparatus is not in service, whereby said propeller shaft may be withdrawn; and by which movement of said propeller will be limited in the event of failure of said aft bearing in service,

whereby said propeller runs on said aft shaft bearing in service without contacting said stern tube and the weight of said propeller is supported in service solely by said aft bearing acting between said propeller shaft and said stern tube.

4,021,144
SUBMERSIBLE PUMP WITH FLOAT SWITCH

Tanechiyo Matsusaka, Kishiwada, Japan, assignor to Elepon Kabushiki Kaisha, Osaka, Japan

Filed Sept. 17, 1975, Ser. No. 614,154
Int. Cl.² F04B 49/00; H01H 35/40
U.S. Cl. 417—40 1 Claim



1. An apparatus to be positioned in a body of liquid for pumping said liquid, said apparatus comprising in combination:

a submersible electric pump in said body of liquid;

floating switch means floating on said body of liquid for actuating said pump in response to the position of said switch means in said liquid, said switch means comprised of:

a hollow float,

a pair of contacts within said float, at least one of said contacts being movable toward and contactable with the other contact,

magnetic means pivotably mounted within said float for attracting said contacts together and causing said contacts to contact each other, and

biasing means connected to said magnetic means for biasing said magnetic means into a position adjacent said contacts and causing said contacts to contact each other when said float is vertically positioned in said body of liquid, said biasing force being overcome by the weight of said magnetic means when said float is tilted away from the vertical a predetermined amount, whereby tilting said float caused by the rise in the liquid level of said body of liquid causes said magnetic means to pivotally rotate against said biasing means away from said contacts, thereby allowing said contacts to move apart;

a cable electrically connecting said pump to said contacts of said switch means; and

adjustible cable holder means fixed to said pump and having said cable held therein at an intermediate position of said cable for adjusting the position of said cable connecting said pump and said swtich means, said adjustable cable holder means comprised of:

a holder attached to said pump, and

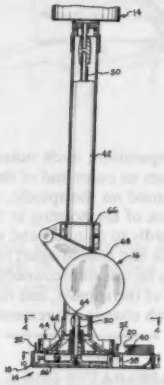
a cable holder adjustably fitted in said holder and holding said cable at an intermediate portion thereof, whereby adjusting the position of said cable holder controls the position of said cable and thus the level of said liquid body at which point said float will tilt sufficiently to cause said switch means to activate said pump.

4,021,145
SUMP PUMP ASSEMBLY

Kenneth V. Pepper, Davison, Mich., assignor to Genova, Inc., Davison, Mich.

Filed Jan. 2, 1976, Ser. No. 646,186
Int. Cl.² F04B 49/00; F01D 21/00; F01B 1/00
U.S. Cl. 417—40 8 Claims

1. A sump pump assembly for pumping liquid from a sump into discharge piping comprising a base module and a power module, said base module including a first pump housing member having outlet means and being adapted to be secured to said discharge piping with said outlet means in communication with said discharge piping, said power module including a support member with a rotary pump impeller mounted on its lower end, a second pump housing member with inlet means adapted to be in communication with the sump, a motor mounted on the upper end of the support member and a shaft extending through the support member drivingly connecting the motor to the pump impeller, the first and second pump housing members defining a free-sliding joint for securing the power module to the base module with the pump impeller in operative position within the housing members and for releasing the power module from the base module when power module is twisted freely in one direction about the axis of said pump impeller, said joint including circumferentially extending shoulders in free-sliding engagement for interlocking said housing members only against relative axial displacement and cooperating stop members associated with said shoulders for limiting the extent of free twisting that can occur in said one direction, said one direction being opposite to the operative direction of turning of said pump impeller, said housing members and said pump impeller forming a pump having said inlet means for receiving liquid from said sump and said outlet means for discharge of the liquid from the sump to said piping.



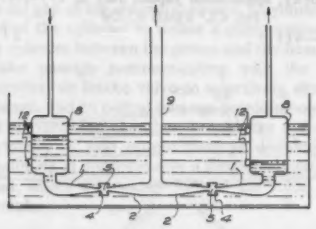
4,021,146
FLUIDIC FLOW CONTROL DEVICES AND PUMPING SYSTEMS

John Russell Tippetts, Sheffield, and Joshua Swithenbank, Hathersage, both of England, assignors to United Kingdom Atomic Energy Authority, Great Britain

Filed Oct. 30, 1974, Ser. No. 519,229
Claims priority, application United Kingdom, Nov. 2, 1973, 50915/73
Int. Cl.² F04F 5/10
U.S. Cl. 417—76 6 Claims

1. A fluid pumping system incorporating a fluidic flow control device having at least two generally aligned and axially spaced apart members having bores therethrough, said bores of said members being tapered, the members being so arranged as to constitute a gradual convergence followed by a gradual divergence, the adjacent ends of the members being substantially the same size and spaced apart to define a gap projecting radially and substantially perpendicular to the aligned bores and positioned between said adjacent ends of said members, the remainder of the system comprising a cylinder, a source of reciprocating pressure gas communicating with one end of the cylinder, the other end being connected to the inlet of one member, the outlet from the other member

being connected to an out-feed pipe, said fluidic control device being set below the surface of a fluid to be pumped, the gap being open directly to the fluid surrounding said device, the reciprocating pressure applied to the cylinder causing said



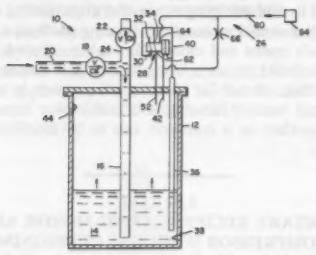
fluid to be first intermittently directly drawn into said flow control device and then into the cylinder and, secondly, additional fluid directly drawn into said fluid control device by the fluid from said cylinder flowing through said control device and the total fluid pumped through said out-feed pipe.

4,021,147

GAS PRESSURE DRIVEN PUMP

Carroll E. Brekke, 3255 Juniper Ave., Santa Rosa, Calif. 95401

Filed Apr. 5, 1976, Ser. No. 673,379
Int. Cl.² F04F 1/06
U.S. Cl. 417—138 **12 Claims**



1. In a gas pressure driven pump which comprises a vessel, means for introducing a liquid into said vessel, means for preventing reverse flow of said liquid into said liquid introducing means, means for introducing a pressurized gas to said vessel, and means responsive to a gas pressure increase in said vessel for flowing said liquid out of said vessel, an improved system substantially independent of the density of said liquid for controlling the flow of pressurized gas into said vessel responsive to the liquid level therein, comprising:

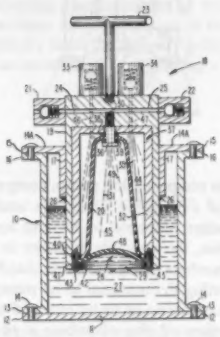
1. valve means having a first, a second and a third port, said valve means having a first mode in which said first port is in gas flow communication with said second port and a second mode in which said first port is in gas flow communication with said third port, said second port communicating in both of said first and second modes with the surrounding atmosphere;
2. first conduit means communicating a bottom portion of said vessel at a first position therein and said first port;
3. second conduit means communicating with a top portion of said vessel at a second position therein;
4. shift means operating responsive to a gas pressure differential between a pair of chambers to shift said valve means from said first mode corresponding to a substantially zero gas pressure differential to said second mode corresponding to a non-zero gas pressure differential, a respective one of said chambers being in gas flow communication with said first conduit means and a respective other of said chambers being in gas flow communication with said second conduit means;
5. third conduit means communicating with a third position within said vessel above said first position and providing a gas pressure escape path from said vessel through said valve means via said first and second ports when the liquid level in said vessel is below said third position, said escape path closing when the liquid level in said third conduit means rises above said third position; and
6. means preventing gas flow from a pressurized gas source when said non-zero gas pressure differential exists and said valve means is in said second mode to the lower pressured of said pair of chambers.

4,021,148

HYDRAULIC FLUID DEVICES

Seymour Moskowitz, 36 Brandon St., Lexington, Mass. 02173

Filed July 16, 1975, Ser. No. 596,506
Int. Cl.² F04B 9/08
U.S. Cl. 417—383 **6 Claims**

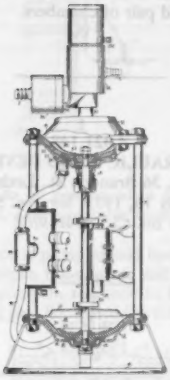


1. A hydraulic fluid device comprising a closed container, a guide sleeve at an upper section of said container, a fluid within said container, plunger means received within said sleeve and constrained for movement relative to said sleeve; means for moving said plunger means within said container and said fluid, said plunger means including a vertical channel and flexible membrane means, said flexible membrane means forming at least first and second chambers within said vertical channel, said second chamber within said first chamber, said first chamber constituting a charging chamber and said second chamber constituting a pumping chamber, first inlet means and first outlet means communicating with said charging chamber, second inlet means and second outlet means communicating with said pumping chamber, said second inlet means and said second outlet means including valve means at least a portion of said flexible means constituting a common wall between said charging chamber and said pumping chamber, a fluid to be pumped entering said pumping chamber through said second inlet means and exiting said pumping chamber through said second outlet means, a charging fluid entering said charging chamber through said first inlet means and exiting said charging chamber through said second inlet means, at least a portion of said flexible membrane means disposed between said fluid in said container and said fluid to be pumped, at least a portion of said flexible membrane means disposed between said fluid to be pumped and said charging fluid, variable pressure to volume ratios are provided by controlling said charging fluid entering and exiting said charging chamber as said plunger means moves within said container and said fluid to be pumped enters said pumping chamber, through said second inlet means and exits said pumping chamber through said second outlet means.

4,021,149
FLUID DRIVEN RECIPROCATING PUMP

Alexander Rutenberg, Haifa, and Alexander Zur, Kfar Bialik, both of Israel, assignors to TMB Industrial Maintenance Ltd., Kiryat Bialik, Israel

Filed Dec. 15, 1975, Ser. No. 640,857
Int. Cl.² F04B *43/26*
U.S. Cl. 417—395 9 Claims

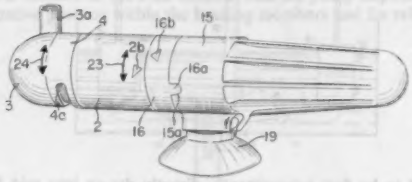


1. A fluid-driven reciprocating pump, comprising: a housing defining a pair of expansible chambers each containing a displaceable member movable to expand and contract the respective chamber, the movable member in at least one of the expansible chambers being a flexible diaphragm; conducting means conducting the material to be pumped to the flexible diaphragm chamber so as to be pumped upon the expansion and contraction of the chamber; a reciprocating rod connecting the flexible diaphragm of the one chamber so that they move in unison; a main valve having a driving fluid inlet, a driving fluid outlet, a connection to said pair of expansible chambers, and a piston movable from a first position effecting communication between the fluid inlet and the pair of chambers to introduce the driving fluid into the chambers, to a second position effecting communication between the chambers and the fluid outlet to discharge the fluid from the chambers; a pilot valve having a movable piston and fluid connections to the main valve for controlling the position of the piston of the main valve; and operating means carried by the reciprocating rod engageable with the piston of the pilot valve for controlling the connections between the pilot valve and main valve, and thereby the fluid connections from the main valve to the pair of expansible chambers, to effect an expansion and contraction of the diaphragm chamber; said conducting means comprising an inlet one-way valve and an outlet one-way valve leading to and from the flexible diaphragm chamber; said inlet one-way valve comprising a housing formed with a fluid chamber therein, the chamber having an inlet and an outlet; a flexible diaphragm disposed within said chamber and dividing same into a fluid inlet compartment containing the inlet and a fluid outlet compartment containing the outlet; an annular rib engageable with the center of one face of the diaphragm, the periphery of the diaphragm including a plurality of openings establishing communication between the two compartments, whereby fluid flow from the inlet direction is permitted through said openings by the diaphragm being flexed out of engagement with the annular rib, whereas fluid flow in the reverse direction is prevented by the diaphragm being flexed into engagement with the annular rib.

4,021,150
BATTERY POWERED PUMP

Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed June 30, 1975, Ser. No. 591,450
Claims priority, application Japan, July 2, 1974, 49-76072
Int. Cl.² F04B *35/04*
U.S. Cl. 417—411 17 Claims

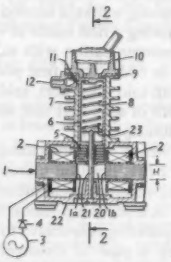


1. A battery powered pump comprising a battery chamber defined by a battery housing for one or more batteries, a motor chamber defined by a watertight and cylinder-shaped motor housing with a motor inside, a pumping chamber having admission and discharge ports, said pumping chamber being connected to the adjoining chamber via a motor-shaft bearing section, a motor shaft extending into said pumping chamber, pump vanes fixed on said motor shaft for sucking in fluid through said admission port and discharging the fluid from said discharge port; said admission port being located, relative to the location of said pump vanes, closer to said motor-shaft bearing section, a flow direction forcing device for forcing the flow of fluid in said pumping chamber in a direction from said motor shaft to said pumping vanes, thereby creating a negative pressure around said motor-shaft bearing section, a switching means which opens and closes, through a relative rotational movement of said motor housing against said battery housing; and an electric circuit for powering the motor in said motor housing, said battery housing and said motor housing being coupled together on a common axis to be rotational against each other.

4,021,151
UNITARY RECIPROCATING MOTOR AND COMPRESSOR WITH GAS CUSHIONING

Maurice Barthalon, Tournefperre, Allee des Safins, 91370 Verrieres le Buillon, France

Continuation-in-part of Ser. No. 480,037, June 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 284,748, Aug. 30, 1972, abandoned. This application June 10, 1975, Ser. No. 585,701
Claims priority, application France, Aug. 31, 1971, 71.31512
Int. Cl.² F04B *17/04, 35/04;* F01B *11/02*
U.S. Cl. 417—417 18 Claims



1. A synchroneous electric motor driven compressor comprising:

a. a reciprocating electric motor including a magnetic armature, a magnetic circuit including an air gap, and means

guiding the armature for reciprocating movement in and out of the air gap; and

b. a driven portion comprising a compressor piston coupled to the armature, a cylinder defined by a cylinder wall in which the piston reciprocates, an elastic return device acting on the piston to urge the magnetic armature out of the air gap of the magnetic circuit, a cylinder head at one end of the cylinder to define a compression chamber in the cylinder between the piston and the head, at least one intake passage communicating with the compression chamber, an intake valve to selectively close the intake passage, and an output passage providing an opening into the compression chamber through the cylinder wall, the periphery of said output passage opening nearest the headbeing at approximaely a disance *d* from the cylinder head, where *d* is within 30% of the value given by the formula:

$$d = H\left[\left(\frac{1-e}{R^{1/k}-1} - .08\right)\right]$$

wherein:

H is the height of the magnetic circuit along the axis of the piston;

e is the volumetric efficiency, defined as the ratio of gas volume passing through the output passage to the gas volume swept by the piston at each stroke, with the volumes being measured under the same conditions of pressure and temperature;

R is the ratio of compression;

k is the coefficient of polytropic compression; and

H and *d* are expressed by the same units of measurement

4,021,152

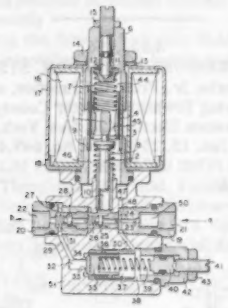
ELECTROMAGNETIC PUMP

Akira Toyoda, Tokyo, Japan, assignor to Taisan Industrial Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 530,273, Dec. 6, 1974, abandoned. This application May 10, 1976, Ser. No. 685,075

Int. Cl.² F04B 49/00

U.S. Cl. 417—417 **2 Claims**



1. An electromagnetic pump comprising a pump body, a cylinder, a pressure chamber, a suction valve and a discharge valve communicating with the pressure chamber, an electromagnetic coil mounted concentrically with an extension line of the longitudinal axis of said cylinder, a plunger case disposed within said electromagnetic coil, a delivery plunger and an electromagnetic plunger fitted in said cylinder and said plunger case, respectively, for reciprocating sliding movement and in abutting engagement with each other, said plungers being retained in pressure engagement between springs, characterized by a pressure adjusting cylinder provided within said pump body and including means communicating said pressure adjusting cylinder with the suction and delivery sides of the pump, a pressure adjusting plunger fitted within said pressure adjusting cylinder for reciprocating sliding movement and with an extremely small clearance between the outer diameter of the pressure adjusting plunger and the inner diameter of the pressure adjusting cylinder in a range where the sliding movement thereof is not prevented, said pressure adjusting plunger having at the top end thereof a valve body which engages a valve seat at an end of a passage connecting the delivery side of the pump with the pressure adjusting cylinder to thereby constitute a check valve, and said pressure adjusting plunger also having a shoulder portion at the top end thereof to thereby constitute a variable orifice relief throttle valve in the form of piston-valve together with a relief port perforated through the side wall of said pressure adjusting cylinder, said pressure adjusting plunger having said check valve and said relief throttle valve constituted separately, a pressure adjusting spring biasing the pressure adjusting plunger so as to close said check valve and said relief throttle valve, whereby said check valve is first opened in a process of rising in pressure in said passage after operation of the pump and on exceeding a predetermined pressure, said variable orifice relief throttle valve operates to adjust the opening degree of the orifice and relief part to thereby control the amount of leak from the delivery side of the pump through said passage, past said check valve and through said relief port so that the delivery pressure of the pump may be maintained at predetermined value whereas from the time said check valve is opened till immediately before said variable orifice relief valve is opened, the pressure adjusting plunger moves in reciprocating movement by the extension and contraction of the pressure adjusting spring to thereby level the delivery pulsation of the pump and operate as an accumulator performing a pressure accumulating action.

4,021,153

LIQUID METERING PUMPS

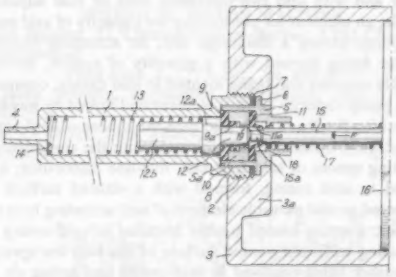
Jean Cloup, 33360 Latresne, France

Filed Mar. 1, 1976, Ser. No. 662,326

Claims priority, application France, Mar. 5, 1976, 76.06916

Int. Cl.² F04B 7/00

U.S. Cl. 417—443 **4 Claims**



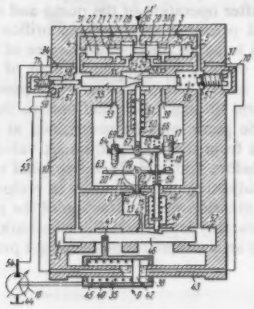
1. A liquid metering pump, comprising a cylinder which is permanently connected to an inlet passage for the liquid to be metered, a plunger piston, which co-operates with a sealing gland on the inlet side, mounted to slide in said cylinder, said plunger piston being urged by an elastic member into contact with a reciprocable actuating rod which co-operates with a sealing gland on the outlet side, the said sealing glands at the inlet and outlet sides being separated by a spacer so as to form an annular chamber around said plunger piston and said actuating rod.

4,021,154

SERVOMECHANISM FOR PUMP CAPACITY CONTROL

Mikhail Fedorovich Gorchakov, Trubnikovsky pereulok, 17, kv. 1, Moscow; Mikhail Grigorievich Kabakov, Petrovsko-Razumovsky proezd, 9, kv. 1, Moscow; Leonid Nikolaevich Kashtanov, 1 Dubrovskaya ulitsa 5, kv. 46, Moscow; Viktor Prokofievich Morozov, Fevralskaya ulitsa, 14/7, kv. 44, Klimovsk Moskovskoi oblasti; Jury Ivanovich Chuprakov, Volokolamskoe shosse, 3, kv. 54, Moscow, and Vitaly Fedorovich Scherbakov, ulitsa Shabolovka, 35, kv. 10, Moscow, all of U.S.S.R.

Filed Oct. 2, 1975, Ser. No. 619,033
Int. Cl.[2] F04B *49/00*; F16D *31/02*
U.S. Cl. 417—218 9 Claims



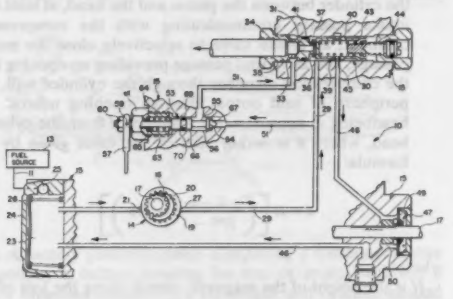
1. A servomechanism for pump capacity control comprising a casing; an adjustable throttle of the nozzle-gate type received in said casing, said throttle having a gate and two nozzles, said nozzles having end faces, operating slots of said throttle being formed between said gate and the end faces of said nozzles; two fixed throttles received in said casing; a source of supply feeding a duct, said duct communicating through said two fixed throttles with said adjustable throttle; an input signal converter received in said casing; a movable element of said input signal converter linked with said gate; a four-slot, five-line distributor having a slide valve and being formed with a plurality of control and operating spaces, installed in said casing; said control spaces communicating through said two fixed throttles with said duct of said source of supply and with said two operating slots of said adjustable throttle; an element for controlling the capacity of said pump, said pump having a discharge line; an actuating hydraulic cylinder being formed with a plurality of spaces, having a movable element and being located in said casing, connected to the pump capacity control element and linked by mechanical position feedback with said gate the spaces of said actuating hydraulic cylinder communicating with the corresponding operating spaces of said four-slot, five-line distributor; a bar located in said casing, formed with a slanted surface and connected to said movable element of said actuating hydraulic cylinder; a spring-loaded pusher installed in said casing and interacting with said slanted surface of the bar; the spring of said pusher being received in said casing and acting on said gate, said bar and said spring-loaded pusher constituting said mechanical position feedback of said hydraulic cylinder; a device located in said casing for ensuring a linear dependence of the speed of movement of said hydraulic cylinder on the displacement of said gate away from the neutral position and acting on said slide valve of the four-slot, five-line distributor; a mechanism for limiting the power of said pump, linked mechanically with said hydraulic cylinder and said gate, and hydraulically with said discharge line of said controlled-capacity pump.

4,021,155

OIL BURNER PUMPING SYSTEM WITH AIR PURGING VALVE

Robert W. Erikson, and Frank L. Harwath, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 13, 1975, Ser. No. 631,578
Int. Cl.[2] F04B *49/00*, *21/00*
U.S. Cl. 417—302 15 Claims



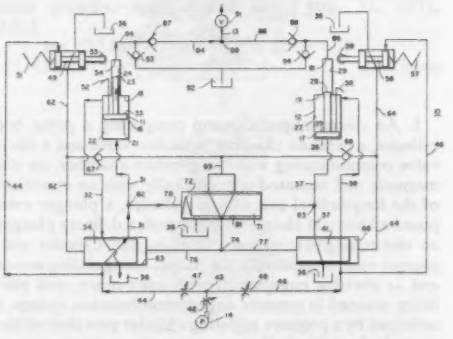
1. A fuel burner pumping system including a fuel pump having an inlet and an outlet, a control valve assembly including a main pressure chamber, an outlet port, a valve member movable within said chamber to open and close said port, and means for urging said valve member toward its closed position, a first outlet passage communicating between said pump outlet and said main chamber to supply pressurized fuel from said pump to said chamber, a nozzle passage communicating with said main chamber through said outlet port, a second outlet passage communicating between the pump outlet and said nozzle passage, valve means disposed within said second outlet passage and being movable between closed and open positions for blocking the flow of fuel through said second outlet passage normal operation of said pump and for opening said second passage to purge air from said system when said pump initially is started and means for urging said valve means toward one of said positions.

4,021,156

HIGH PRESSURE HYDRAULIC SYSTEM

Francis Joseph Fuchs, Jr., Princeton Junction, and John Richard Shaffer, Ewing Township, Mercer County, both of N.J., assignors to Western Electric Co., New York, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,442
Int. Cl.[2] F04B *17/00*
U.S. Cl. 417—346 4 Claims



1. A method of providing a continuous flow of a hydraulic fluid at a relatively high pressure through an output path, which method comprises:

a. operating a first intermittently active pressure intensifier,

capable of pressurizing the hydraulic fluid to a relatively high pressure when in an active phase of operation, with the first pressure intensifier coupled between a source of hydraulic fluid at relatively low pressure and the output path;

b. operating a second intermittently active pressure intensifier, also capable of pressurizing the hydraulic fluid to said relatively high pressure when in an active phase of operation, with the second pressure intensifier coupled in parallel with the first pressure intensifier between the source of hydraulic fluid and the output path;

c. sensing when the first pressure intensifier enters into condition to pressurize the hydraulic fluid to said relatively high pressure;

d. sensing when the second pressure intensifier enters into condition to pressurize the hydraulic fluid to said relatively high pressure;

e. initiating termination of the active phase of operation of the first pressure intensifier upon each sensing that the second pressure intensifier has entered into said pressurizing condition;

f. initiating termination of the active phase of operation of the second pressure intensifier upon each sensing that the first pressure intensifier has entered into said pressurizing condition;

g. initiating the entry of hydraulic fluid from the second pressure intensifier into the output path, at a flow rate matching that at which the hydraulic fluid has been flowing from the first pressure intensifier into the ouput path, upon each decrease, to below said relatively high pressure, in the pressure of the hydraulic fluid flowing from the first pressure intensifier into the output path; while simultaneously

h. terminating the flow of hydraulic fluid from the first pressure intensifier into the output path; and

i. initiating the entry of hydraulic fluid from the first pressure intensifier into the output path, at a flow rate matching that at which the hydraulic fluid has been flowing from the second pressure intensifier into the outlet path, upon each decrease, to below said relatively high pressure, in the pressure of the hydraulic fluid flowing from the second pressure intensifier into the output path; while simultaneously

j. terminating the flow of hydraulic fluid from the second pressure intensifier into the output path.

4,021,157

DIAPHRAGM PUMPS DRIVEN BY PULSE PISTONS

David Henry Theophilus Elderfield, Fordingbridge, England, assignor to Sedco Products Ltd., Salisbury, England

Filed Apr. 8, 1975, Ser. No. 566,517

Claims priority, application United Kingdom, Apr. 11, 1974, 16379/74

Int. Cl.² F04B 9/10, 35/02

U.S. Cl. 417—387 9 Claims

1. A diaphragm pump comprising:

a pump housing having two opposing end portions aligned along a common axis;

one hollow cylinder mounted in each end portion aligned along said common axis;

a reciprocal piston mounted in each cylinder;

a drive shaft rotatably mounted within said housing in the horizontal plane containing said cylinders and perpendicular to said common axis between said cylinders;

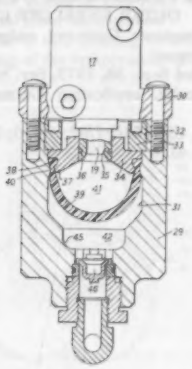
an eccentric mounted on said drive shaft adjacent to and contacting said pistons in said cylinders, whereby rotating said drive shaft and said eccentric mounted thereon causes said pistons to reciprocally move in said cylinders;

a pump chamber detachably mounted to each of said end portions and in communication with said cylinders, said chambers positioned completely beneath the horizontal plane through said common axis between said opposing ends, and each of said pump chambers being comprised of:

a chamber body with a bore therein, said bore open at only one end of said body;

a circumferential rib around the inside of said bore near the open end thereof; and

an annular diaphragm clamping member slidably fitted in and forced against the inside of said bore at the open end thereof adjacent said circumferential rib, said member having an axially extending flange portion and a nose portion opposite said circumferential rib with said diaphragm thereinbetween, whereby a substantially hemispherical diaphragm is securely held within said chamber body between said nose and said rib;



said substantially hemispherical diaphragm being of elastomeric material clamped at its periphery in each of said pump chambers extending downward in said chambers with its curved surface directed toward the bottom of said chamber and dividing said chambers into an inner portion on the inside of said diaphragm in communication with said cylinder and an outer portion on the outside of said diaphragm within said pump chamber; and

non-return inlet and outlet valves fitted through each of said pump chambers in said outer portions thereof on the outside of said diaphragms.

4,021,158

SPHERICAL PISTON MACHINE

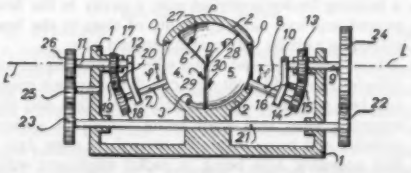
Roger Bajulaz, 22, Chemin William-Barbey, 1292 Chambesy, Switzerland

Filed Sept. 2, 1975, Ser. No. 609,817

Claims priority, application Switzerland, July 3, 1975, 8650/75

Int. Cl.² F01C 1/02; F03C 3/00; F04C 1/02; F02B 55/14

U.S. Cl. 418—52 45 Claims



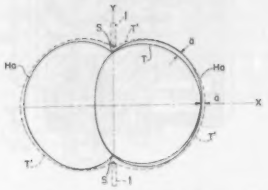
1. A spherical piston machine comprising a chamber whose wall is at least partly spherical; a spherical piston, mounted within this chamber, comprising two elements; this chamber and this piston delimiting a free space of variable shape; each of the elements of the piston being angularly fixed to a control axle, forming an angle with the longitudinal axis of the ma-

chine and extending in a direction passing through the center of the spherical chamber; the two elements of the spherical piston being articulated in a zone extending perpendicular to each control axle; means for rotatably driving about its own axis each of the control axles; the elements of the piston being independent from each other; and means for rotatably driving each control axle in opposite directions and at different speeds of rotation about the longitudinal axis of the machine whereby said zone rotates about said longitudinal axis of the machine.

4,021,159
HOUSING FORMATION FOR A ROTARY PISTON MACHINE OR TROCHOIDAL CONSTRUCTION WITH AN OUTER ENVELOPE CURVE

Franz Huf, Constance, Germany, assignor to Dornier System GmbH, Germany

Filed Sept. 30, 1975, Ser. No. 618,253
Claims priority, application Germany, Dec. 19, 1974, 2460059
Int. Cl.² F01C *1/02, 21/10;* **F04C** *17/02*
U.S. Cl. 418—61 B **2 Claims**



1. In a housing formation for a rotary piston machine of trochoidal construction with an outer envelope curve and a housing corresponding to said outer envelope curve, said piston being patterned after a turning point-free trochoid *n* : 1, and working chambers between said housing and said piston separated by radial seals in said housing,

the improvement comprising that the housing has the form of an outer parallel curve to the piston contour when said piston is in its upper dead center position, the equidistant distance of said parallel curve being at least such that said parallel curve will twice touch from the outside the associated exact outer envelope between two consecutive radial seals.

4,021,160
ORBITAL MOTOR

Vukasin Todorovic, 220 Littleton Road, Apt. F4, Parsippany, N.J. 07054

Continuation-in-part of Ser. No. 585,307, June 9, 1975, abandoned. This application Dec. 15, 1975, Ser. No. 640,635
Int. Cl.² F01C *1/02;* **F02B** *53/00*
U.S. Cl. 418—61 R **8 Claims**

5. A device comprising:

a. a housing having a central axis, a cavity in the housing around said axis and a plurality of slots in the housing extending radially with respect to said axis;

b. a front end plate associated with the housing to form a cylinder from said cavity; p1 c. a shaft having a main axis and two eccentric sections defined by first and second eccentric axes, said shaft being supported within the cylinder and being rotatable around its main axis, said first eccentric axis being in radial alignment with the second eccentric axis and said first eccentric axis being offset from the main axis one half the distance of the second eccentric axis;

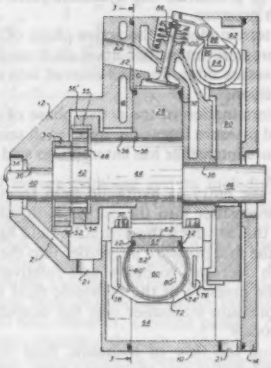
d. an external pinion gear rotatably mounted about the first eccentric axis;

e. a fixed ring gear fixedly mounted with respect to the housing and centered with respect to said main axis, so as to engage said pinion at a point in radial alignment with the first and second eccentric axes;

f. an orbital ring gear of the same diameter and pitch as the fixed ring gear, but rotatably mounted about the second eccentric axis so as to engage the pinion at a point on the pinion diametrically opposite the point of engagement of the fixed ring gear with the pinion;

g. a piston received in said cavity mounted about the second eccentric axis so that the shaft is rotatable with respect to the piston;

h. means to connect said piston to the orbital ring gear to prevent rotation of the piston relative to the orbital ring gear;



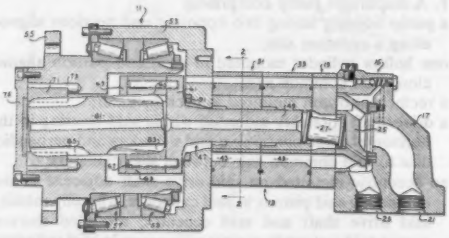
i. a plurality of vanes mounted on the piston extending radially from the piston, being slidably received in the slots in the housing and further being slideable with respect to said piston in a tangential direction so that the vanes will reciprocate in said slots with orbital motion of the piston, said vanes defining a multiple of distinct chambers within the cylinder;

j. means to control the introduction and removal of a working fluid from each chamber whereby purely orbital motion will be exhibited by the piston with rotation of the shaft.

4,021,161
ROTARY FLUID PRESSURE DEVICE AND THRUST ABSORBING ARRANGEMENT THEREFOR

Hugh L. McDermott, Minneapolis, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 17, 1976, Ser. No. 658,330
Int. Cl.² F01C *1/02;* **F16D** *3/18;* **F16C** *32/00;* **F01C** *21/00*
U.S. Cl. 418—61 B **7 Claims**



1. A rotary fluid pressure device comprising:

a. a first member having a plurality N of internal teeth;

b. a second member having a plurality N—1 of external teeth, said second member being disposed within said first

member for orbital and rotational movement therein, said internal teeth and said external teeth interengaging during said movement to define a plurality of expanding and contracting volume chambers;

c. an output shaft assembly mounted for rotation relative to said first member;

d. a shaft member having one portion in engagement with said second member and another portion in engagement with said output shaft assembly to transmit torque between said second member and said output shaft assembly;

e. housing means defining a generally annular frusto-conical wear surface disposed about said shaft member and defining an axis substantially coincidental with the axis of said first member;

f. said shaft member including a stop surface extending outwardly from said shaft member for engagement with said wear surface when said shaft member is biased toward said second member, said wear surface being disposed between said stop surface and said second member, the movement of said shaft member adjacent said stop surface defining an eccentricity E about said axis of said wear surface;

g. said wear surface having an average diameter approximately equal to D, wherein:

$D = N \times 2E$.

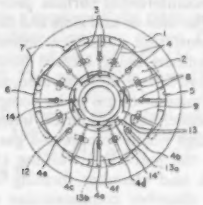
4,021,162
VANE-TYPE ROTARY MACHINES

Kazuo Shinoda, Gifu, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Filed Apr. 22, 1975, Ser. No. 570,490

Int. Cl.² F01C *1/00, 21/00;* F03C *3/00;* F04C *1/00*

U.S. Cl. 418—82 **10 Claims**



1. In a vane-type rotary machine having a casing and a rotor therein, said rotor having an annular housing chamber formed in each side wall, seesaw members disposed in each of said chambers, means in said chambers for mounting said members for seesaw action, a plurality of radially disposed vane slots formed about the periphery of said rotor, a movable vane positioned in each of said slots, a guide hole formed between the bottom of each vane slot and each housing chamber, and a push rod closely and slidably mounted in each guide hole, the outer ends of said rods engaging the inner ends of said vanes and the inner ends of pairs of spaced apart rods respectively engaging opposite ends of said seesaw members.

4,021,163
ROTARY-PISTON ENGINE HOUSING

Yasuyuki Morita, and Hiroshi Kodama, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed Oct. 6, 1975, Ser. No. 620,197

Claims priority, application Japan, Oct. 11, 1974, 49-123045[U]; Mar. 3, 1975, 50-29284[U]

Int. Cl.² F01C *21/06, 21/10*

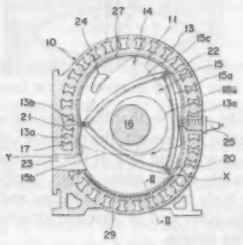
U.S. Cl. 418—83 **12 Claims**

1. An engine housing structure for a rotary piston internal combustion engine including a multi-lobed rotor held in position within said housing structure for eccentric rotation, said multi-lobed rotor having apex portions held in sliding contact with a trochoidal inner surface within said housing structure for successively defining intake, compression, combustion, expansion and exhaust chambers therein during eccentric rotation of said rotor, said housing structure further including intake and exhaust openings formed therein and respectively in communication with said intake and exhaust chambers, which housing structure comprises:

a peripheral casing having the epitrochoidal surface formed therein;

a pair of end walls connected to each other with said peripheral casing sandwiched therebetween to provide a cavity, said intake, compression, combustion, expansion and exhaust chambers being formed in said cavity and on a plurality of arcuate flanks of said rotor in cooperation with said trochoidal inner surface; and

heat insulating means in said housing structure to prevent substantial lowering of the temperature of an exhaust gas



within said expansion chamber, said heat insulating means comprising a heat insulating layer in said peripheral casing, said heat insulating layer having a length so as to extend between a first point on the trochoidal inner surface, which is aligned with the position assumed, when the expansion chamber is at the minimum volume, by one of the apex portions of the leading side of one of the rotor flanks with respect to the direction of rotation of the rotor, which one rotor flank defines said expansion chamber in cooperation with that portion of the trochoidal inner surface which faces said one rotor flank, and a second point on the trochoidal inner surface which is subsequently aligned with the position subsequently assumed, when the expansion chamber is at the maximum volume, by said one apex portion on said leading side of said one rotor flank with respect to the direction of rotation of said rotor.

4,021,164
PUMP HAVING RECIPROCATING PUMPING MEANS

Hans Peter Tell, Osterskar, Sweden, assignor to AB Piab, Sweden

Filed Oct. 6, 1975, Ser. No. 620,627

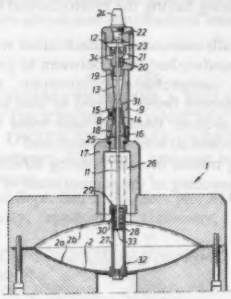
Claims priority, application Sweden, Oct. 16, 1974, 7413016

Int. Cl.² F04B *43/06*

U.S. Cl. 417—390 **6 Claims**

1. A pump having reciprocating pumping means driven by a periodically varying pressure in a hydraulic or pneumatic driving device, the pump including a pumping chamber having an inlet valve and an outlet valve, said driving device comprising an ejector to which a driving medium is supplied, said medium passing through a suction channel which causes a pressure reduction in a pressure chamber communicating therewith, a valve body driven by the pressure variations in the pressure chamber being displaceable from an initial position to a position where said valve body closes an outlet provided for the driving medium and is disposed in a valve seat, whereby the driving medium being supplied to the pressure chamber through said suction channel causes the pressure in the pressure chamber to rise and the valve body is urged to

return to the initial position after retaining force emanating from the pressure of the driving medium and acting on the valve body has been overcome, the ejector, once the valve body is returned to the initial position, allows a pressure reduction to be created in the pressure chamber whereby the pressure variations in the pressure chamber act on the pumping means of the pump so that the pumping means is displaced in a reciprocating movement, the pressure chamber is in direct communication with one side of the reciprocating means and said reciprocating means being a thin flexible sheet material, and the valve body being attached to one end of a displaceable valve stem the other end of which is attached to the reciprocating pumping means.



4,021,165

ROTATIVE MACHINE FOR FLUIDS WITH SPIRAL-LIKE PASSAGES AND VANE WHEELS

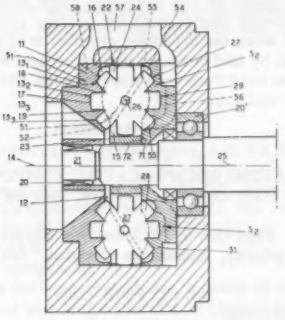
Eugeniusz M. Rylewski, 43 bis, Avenue du Gal Leclerc, 78470 St. Remy les Chevreuse, France

Filed Dec. 10, 1975, Ser. No. 639,628

Claims priority, application France, Dec. 13, 1974, 74.41257

Int. Cl.[2] F01C *1/00;* **F03C** *3/00;* **F04C** *1/00;* **F01C** *19/00*

U.S. Cl. 418—111 **6 Claims**



1. A rotative machine for fluids comprising first and second stator plates with spiral-like passages, a rotor disc facing said stator plates mounted for rotation relative thereto on a common axis and carrying, on its face in front of the passages, vane wheels mounted for rotation on axes transverse to the said common axis whose vane circulate in the passages where they form fluid compartments completed by the cooperating surfaces of the stator and of the rotor covering the passages, characterized by the fact that the rotor has vane wheels cooperating, by their diametrally opposite parts, simultaneously with the passages of the first stator which extend between a first inlet chamber and a first outlet chamber and with the passages of the second stator which extend between a second inlet chamber and a second outlet chamber, the fluid passages connecting the first inlet and first outlet chambers of the first stator do not communicate with the fluid passages connecting the second inlet and second outlet chambers of the second stator, whereby the pressure exerted by fluid circulating in said machine against said vanes is in the same direction on each side of said rotor so that said vane wheels operate as thrust bearings in said rotor.

4,021,166

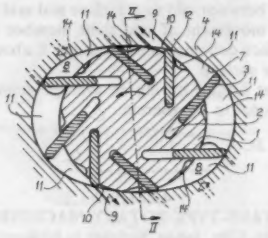
ROTARY VANE COMPRESSOR WITH INCREASED OUTLET THROUGH-FLOW AREA

Rune Glanvall, Norrkoping; Hans Kalen, Kolmarden, and Kurt Pettersson, Norrkoping, all of Sweden, assignors to Stal-Refrigeration AB, Norrkoping, Sweden

Filed Dec. 1, 1975, Ser. No. 636,377

Int. Cl.[2] F04C *17/00, 29/08*

U.S. Cl. 418—183 **3 Claims**



1. A vane type rotary compressor comprising a hollow stator having end plates and forming a generally cylindrical inner surface, a rotor mounted for rotation in the stator and having an outer circumferential surface provided with slots, and vanes arranged to slide in said slots and to seal against the end plates and against said cylindrical inner surface of the stator, working chambers being formed between the vanes, the rotor and said cylindrical inner surface, the stator having an inlet port for admission of gas to be compressed and also having an outlet channel, said cylindrical inner surface having an outlet port through which compressed gas is exhausted to said channel from the individual working chambers as the rotor rotates, each said chamber forming an outlet space through which the chamber communicates with said outlet port during said exhaust of compressed gas from the chamber, the compressor being characterized in that, in order to increase the through-flow area of said outlet space and thereby allow a large built-in volume ratio of the compressor, the outer circumferential surface of the rotor is provided in each working chamber with an indentation confined mainly to a region located next to the vane partly defining the chamber and which is the leading vane of the chamber reckoned in the rotation direction of the rotor, said indentation being substantially spaced from the trailing vane of the chamber.

4,021,167

APPARATUS FOR MANUFACTURING SPHERICAL HOLLOW PARTICLES

Itaru Niimi, Nagoya; Kametaro Hashimoto, Toyota; Kenji Ushitani, Toyota; Masashi Shibata, Toyota, and Yoshitaka Takahashi, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Division of Ser. No. 379,828, July 16, 1973, Pat. No. 3,962,385. This application Oct. 21, 1975, Ser. No. 624,563

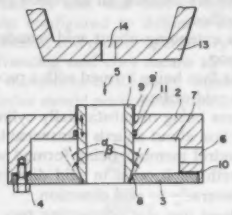
Claims priority, application Japan, July 17, 1972, 47-071447

Int. Cl.[2] B22D *23/08;* **B29C** *23/00*

U.S. Cl. 425—7 **5 Claims**

1. Apparatus for manufacturing spherical hollow particles, which comprises a core defining an internal passage for molten metal flow and having a tapered end, a ring with a hole which receives said tapered end, and a housing which con-

nects said core and said ring to define therewith a pressure-resistant water chamber the end of said core and the hole receiving said core having edges inclined at slightly different slopes, one of said edges being provided with a plurality of



slots so that by vertically shifting said core relative to said ring, the gap between said core and said ring can be adjusted and the water supplied to said housing permitted to flow through said slots to form an inverted cone of water.

4,021,168

TIRE MOLD HAVING WASHERED NAILS INSERTED IN THE VENTS

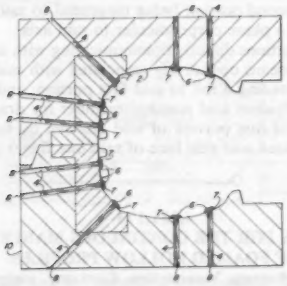
Charles R. Dailey, Cuyahoga Falls, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 657,416, Feb. 12, 1976, Pat. No. 3,989,430. This application June 18, 1976, Ser. No. 697,643

The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

Int. Cl.² B29H *5/02*

U.S. Cl. 425—28 R **6 Claims**



1. A tire mold for imparting a tread design into the surface of a tire while the tire is being cured, said tire mold having vents for the purpose of releasing air which would otherwise be trapped as the uncured rubber is forced into the tread design section of the mold, the improvement which comprises at least one nail having a shank inserted into a mold vent, the nail having a head, at least one washer positioned under the head of the nail, the head of each nail and the at least one washer being inside the mold cavity, each nail being secured into place so that each shank is movable along the length of the vent from zero to 0.125 mm.

4,021,169

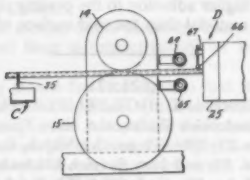
APPARATUS FOR THE MANUFACTURE OF SIDING

Peter F. Heilmayr, 1525 N. Walnut St., and Sol B. Kimbrell, 1463 N. Walnut St., both of McPherson, Kans. 67460

Division of Ser. No. 211,804, Dec. 23, 1971, Pat. No. 3,825,390, which is a division of Ser. No. 2,770, Jan. 14, 1970, abandoned. This application Jan. 23, 1974, Ser. No. 436,003

Int. Cl.² B29F *3/08*

U.S. Cl. 425—71 **2 Claims**



1. Apparatus for making siding having a butt portion, a hanger portion, and an intervening panel, said siding being formed of thermoplastic resin, said apparatus comprising a resin plasticating extruder having a die with an extrusion orifice of cross sectional shape generally conforming with the cross section of the siding and lip portions adjacent the extrusion orifice, means downstream of said extruder for embossing said panel, means downstream of said embossing means for cooling the siding to harden the extruded siding, and a bar mounted to frictionally engage a side face of the intervening panel of the extruded siding, the bar being positioned after the extrusion orifice and before the embossing means and the cooling means

---

4,021,170

EXTRUDER WITH BLOW HEAD

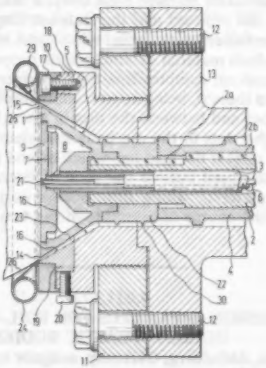
Heinz-Erhardt Andersen, Burgkirchen, Alz, and Georg Stangl, Ehring, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 17, 1976, Ser. No. 686,927

Claims priority, application Germany, May 21, 1975, 2522357

Int. Cl.² B29D *23/04*

U.S. Cl. 425—72 R **6 Claims**



1. Extruder with blow head comprising a cylindrical body containing at least one rotating screw in coaxial position, a feeding device for the thermoplastic material near one end of the cylinder and a blow head comprising a housing and a mandrel at the other end of the cylinder forming a slit tapering in the direction of flow of the plasticized material and through which said material issues, the screw and the blow head being

arranged in one plane, and directly behind the blow head a cooling device for cooling the extruded tube, wherein

a. the screw and the mandrel are rigidly connected with each other without any distortion being possible,
b. the lip of the housing of the blow head protrudes from 0.1 to 10 mm over the lip of the mandrel,
c. the diameter of the slit formed by the housing and the mandrel is in the range of from 1 to 20 mm in the most narrow area, and
d. the surface of the housing facing the surface of the mandrel has a higher adhesion to the passing plasticized thermoplastic material than the said surface of the mandrel.

4,021,171

HIGH-PRESSURE AND HIGH-TEMPERATURE DEVICE

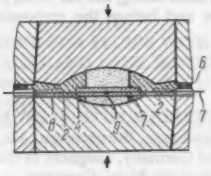
Alexandr Alexandrovich Shulzhenko, Novo-Konstantinovskaya ulitsa, 17, kv. 27; Viktor Ivanovich Vitjuk, Radomyshlskaya ulitsa, 25, kv. 59, and Jury Savvich Maslenko, ulitsa Parkhomenko, 47, kv. 59, Ala.L OF KIEV U.S.S.R.

Continuation of Ser. No. 566,828, April 10, 1975, abandoned, which is a continuation of Ser. No. 499,524, Aug. 22, 1974, abandoned, which is a continuation of Ser. No. 429,834, Jan. 2, 1974, abandoned, which is a continuation of Ser. No. 140,207, May 4, 1971, abandoned. This application Mar. 1, 1976, Ser. No. 662,902

Claims priority, application U.S.S.R., May 12, 1970, 1434856

Int. Cl.² B30B *11/32*

U.S. Cl. 425—77 **4 Claims**



1. A high-pressure and high-temperature device comprising: two identical complementary dies having closing surfaces at least one of which contains a plurality of slots therein, the closing surfaces having recesses so that when the dies are locked in assembly to form a die body, a reaction chamber is formed by the recesses and the slots are disposed in the die body; a container made from a heat and electro-insulating material, which material exhibits plastic properties when subjected to uniform compression, the container with a reaction mass placed therein, being compressibly disposed in the reaction chamber and between the dies in assembly; and lead-ins placed in the slots in the die body and electrically insulated therefrom, so that the lead-ins, which extend into the reaction mass, are disposed outside the zone of intensive flow of the container material, which flow occurs during compression thereof in the course of assembly of the two complementary dies.

4,021,172

EXTRUSION APPARATUS FOR FOIL-COVERED, HOLLOW PLASTIC BODIES

Erich Prinz, Aichelberg, Germany, assignor to Plastic & Form Kunststoff-Verarbeitungs-GmbH, Wendlingen, Germany

Filed May 12, 1975, Ser. No. 576,341

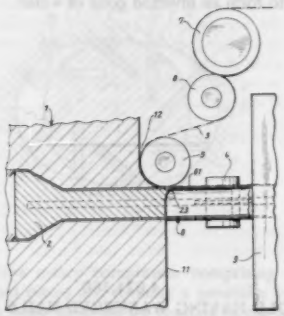
Claims priority, application Germany, May 31, 1974, 2426543

Int. Cl.² B29F *3/04*

U.S. Cl. 425—113 **3 Claims**

1. Extrusion apparatus comprising:

a. a die member formed with a passage extending therethrough in a predetermined direction of extrusion,
   1. said die member having a front face transverse to said direction,
   2. said passage terminating in an orifice in said front face;
b. a mandrel member secured in said passage,
   1. said members defining an extrusion gap therebetween in said orifice,
   2. said gap extending about said mandrel member in a closed loop,
   3. said front face being formed with a recess contiguously adjacent said orifice,
   4. said recess being of substantially cylindrically arcuate cross section about an axis transverse to said direction,
   5. said mandrel member being formed with at least one slot therethrough open in said direction of extrusion and transversely to said direction,
   6. said at least one slot connecting two portions of said gap and separating a plurality of finger portions of said mandrel member,



   7. one of said finger portions projecting outward of said orifice beyond another finger portion of said mandrel member, said one finger portion having a side face extending in said direction of extrusion and transverse to said axis;
c. a cylindrical roller mounted in said recess for rotation about said axis,
   1. said roller defining a first portion of a channel jointly with said die member in said recess and a second portion of said channel with said mandrel member,
   2. said second portion being tangential to said first portion in a plane perpendicular to said axis,
   3. said portions directly communicating with each other;
d. feeding means operatively associated with said first portion for feeding a foil to said first portion; and
e. means adjacent said mandrel member for draping a foil fed to said first portion of said channel by said feeding means about said side face of said one finger portion.

4,021,173

APPARATUS FOR THE CONTINUOUS MANUFACTURE OF FOAMED HOLLOW PROFILES

Alfred Schlieckmann, Vaterstetten, Germany, assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sept. 22, 1975, Ser. No. 615,248

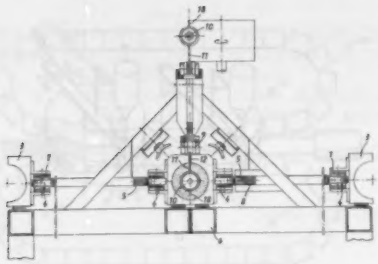
Claims priority, application Germany, Oct. 15, 1974, 2449044

Int. Cl.² B29D *27/04*

U.S. Cl. 425—115 **9 Claims**

1. Apparatus for continuous manufacture of a foam pipe or annulus having a longitudinal slit along its wall to give lateral access to the center of the annulus, said apparatus having an internal core and complementary outer mould portions externally and spacedly surrounding said core, wherein said outer mould portions are adapted and arranged to be displaced in movement-conforming manner along a predetermined recti-

linear path to form the outer surface of a moving moulding channel, core support means disposed externally of said outer mould portions and adapted and arranged to support said core in spaced relation in said moulding channel, said apparatus being characterized in that said core comprises segmented contiguous means configured to define a continuous inner surface of the annulus, and means operatively associated with said core for advancing said core means along said pedetermined path in movement-conforming manner concommitantly with said outer mould portions to produce a continuous,



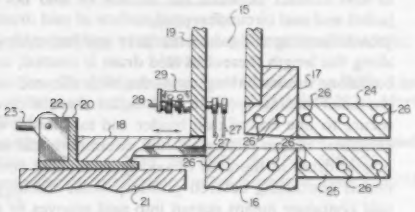
moving, moulding channel of annular configuration throughout said predetermined path, said moulding channel having open inlet and outlet ends, a device operatively associated with said core for advancing a carrier sheet into said inlet end and causing it to conform with said outer annular surface during advance along said predetermined path, and other means adapted to deposit a self-rising foam mix on said carrier sheet ahead of said moulding channel inlet, whereby said self-rising foam mix fills said moulding channel and encases said advancing core means during travel along said predetermined path.

4,021,174

APPARATUS FOR FORMING COMPOSITION BOARD BY EXTRUSION

James J. Breitzman, Dallas, Tex., assignor to ITP Corporation, Dallas, Tex.

Filed Sept. 22, 1975, Ser. No. 615,431
Int. Cl.² B29J *5/00*
U.S. Cl. 425—135 **5 Claims**



1. In apparatus for extruding composition board from a mixture of lignocellulose fines and resins, wherein said board is comprised of a flat portion and a plurality of ribs extending outwardly therefrom and said apparatus includes

an upper mold structure having an upper mold surface for forming a planar surface on said board;

a lower mold structure having a lower mold surface including a plurality of parallel channels for forming a ribbed surface on said board, said lower mold structure being spaced from said upper mold structure to form a mold cavity having an inlet opening and an outlet opening, said lower mold structure extending beyond said inlet opening;

structure forming a feed chamber for said mixture leading to said inlet opening, the portion of said lower mold structure which extends beyond said inlet opening forming a channelled floor for said feed chamber;

means including a reciprocating piston structure mating with said inlet opening for moving said mixture through said mold cavity to said outlet opening;

improved means for agitating said mixture in said feed chamber above said channels in said lower mold structure comprising:

a plurality of first finger members each positioned above a respective channel;

a plurality of second finger members each associated with and spaced from a respective one of said first finger members;

first rotating means for rotating said first finger members each about an axis parallel to the respective channel;

second rotating means for rotating said plurality of second finger members each about said respective axis, the associated first and second finger members being rotatable independent of each other;

means for sensing the position of said reciprocating piston structure and generating a first signal indicative of said reciprocating piston structure being at a first position at or near one end of the travel and generating a second signal indicative of said reciprocating piston structure being at a second position at or near the other end of the travel; and

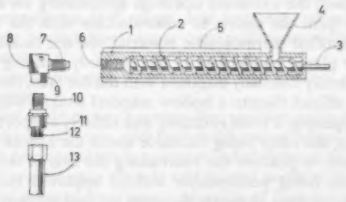
control means responsive to said first signal for actuating said first rotating means to rotate said plurality of first finger members in a first direction and for actuating said second rotating means to rotate said plurality of second finger members in a second direction and responsive to said second signal for actuating said first rotating means to rotate said plurality of first finger members in said second direction and for actuating said second rotating means to rotate said plurality of second finger members in said first direction.

4,021,175

EXTRUSION DEVICE

Jean-Jacques Wuhrmann, Vevey, and Paul van de Rovaart, Chexbres, both of Switzerland, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Division of Ser. No. 433,113, Jan. 14, 1974, abandoned, which is a division of Ser. No. 225,770, Feb. 14, 1972, abandoned. This application July 16, 1975, Ser. No. 596,257
Claims priority, application Switzerland, Feb. 19, 1971, 2429/71
Int. Cl.² B29F *3/04*
U.S. Cl. 425—191 **6 Claims**



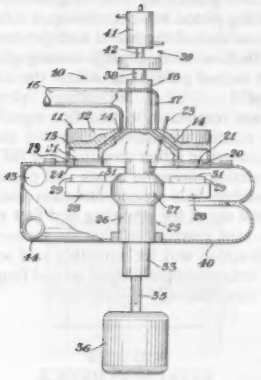
1. An extrusion device comprising a barrel having an exit opening, means compressing, heating and advancing in the barrel material to be extruded, and a nozzle communicating with the exit opening of the barrel, said nozzle comprising an elongated body having a cylindrical wall portion enclosing space defining an axial passage, and an even numbered plurality of fins of arcuate cross section extending longitudinally from said cylindrical wall portion, said fins being circularly spaced about the longitudinal axis of said passage, tip end

portions of alternate ones of said fins being turned inwardly relative to the remaining fins toward said longitudinal axis, said remaining fins extending in substantially straight disposition from said cylindrical wall portion.

4,021,176
CUTTING APPARATUS

Edward V. Dettmer, Bay City, and Earl T. Heckeroth, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 3, 1975, Ser. No. 619,350
Int. Cl.² B29C 17/14
U.S. Cl. 425—313 6 Claims

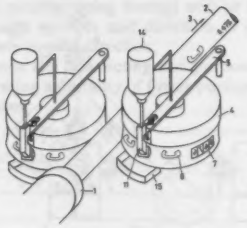


1. An apparatus for the preparation of granules from a plurality of extruded heat-plastified synthetic resinous thermoplastic strands, the apparatus comprising in cooperative combination a die, the die comprising a generally annular die body, the die body defining a generally annular plenum, the plenum having means to communicate with a source of heat-plastified synthetic resinous material, a die plate affixed to and supported by the die body, the die plate having a generally annular configuration and defining a plurality of extrusion openings capable of extruding a heat-plastified synthetic resinous strand, the extrusion openings terminating on a die face remote from the means to communicate with the source of heat-plastified thermoplastic material, the die face having an annular planar configuration, the die body defining an opening generally coaxially disposed with the die face, the die body having affixed thereto a hollow mandrel coaxial with the axis of the opening, a rotor rotatably and slidably supported on the mandrel, the rotor being rotatable about the axis of the opening means to position the rotor along the axis of the opening, the rotor being positionable without apparent backlash, at least two cutting elements disposed on and supported by the rotor, the cutting elements being adjacent the face of the annular die, the cutting elements having cutting edges which are resiliently supported relative to the rotor and capable of flexing toward or away from the die face, means to rotate the rotor relative to the die face, the rotor defining at least two passageways extending generally radially outwardly, the passageways terminating generally adjacent said cutting elements so that liquid is thrown outwardly by centrifugal force toward the cutting elements, and means to supply a cooling liquid to said generally radially outwardly extending passages.

4,021,177
APPARATUS FOR FORMING RAISED MARKS ON PLASTIC CABLE JACKETS

Hans Kaiser, Ditzingen, and Ernst Konnerth, Stuttgart, both of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,785
Int. Cl.² B29F 5/02
U.S. Cl. 425—324 R 2 Claims



1. An apparatus for forming raised marks in a hot plastic cable jacket along the length thereof comprising:

a screw extruder producing at an output thereof said hot cable jacket;

a holder disposed adjacent and above said output of said screw extruder and on at least one side of said hot cable jacket;

a drum rotatably attached adjacent the center of said holder, said drum being positioned adjacent said output of said screw extruder and on at least one side of said hot cable jacket emerging from and moving away from said output of said screw extruder as said hot cable jacket is pulsed from said output of said screw extruder, said drum being attached to said holder to have a circumferential surface of said drum in contact with the surface of said hot cable jacket, said circumferential surface of said drum being provided at regular intervals with grooves corresponding to the outlines of said raised marks, said drum being rotated by said moving hot cable jacket due to said contact between the surface of said hot cable jacket and said circumferential surface of said drum, said groove forming said raised marks in said hot cable jacket along the length thereof as said drum is rotated; and

a container means having an outlet with the end of said container means opposite said outlet thereof pivotably secure to one end of said holder and said outlet of said container means resting on said circumferential surface of said drum in the area of said grooves, said container means containing colored plastic powder discharged at said container means output into said grooves to enable simultaneous forming of said raised marks by said grooves and coating said raised marks by said grooves with said plastic powder which, when coming into contact with said hot cable jacket, is sintered into said raised marks formed by said grooves and fuses with said hot cable jacket to provide said raised marks with a predetermined color; said container means including

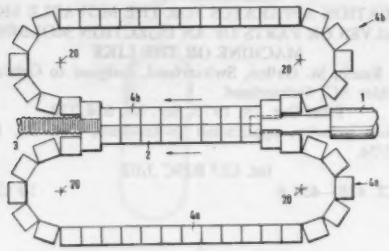
a tube having an outlet, said tube being angled with respect to said drum; and

a felt packing ring coupled to said tube adjacent said outlet of said tube, said tube being pivoted toward said circumferential surface of said drum to force said oulet of said tube and said ring against said circumferential surface of said drum in the area of said grooves to ensure that said powder is discharged into only said grooves.

4,021,178
APPARATUS FOR MAKING TUBING FROM THERMOPLASTIC SYNTHETIC MATERIAL

Franz Josef Braun, Hassfurt, Main, Germany, assignor to Frankische Isolierrohr-und Metallwarenwerke Gebr. Kirchner, Konigsberg, Germany

Filed Jan. 12, 1976, Ser. No. 648,227
Claims priority, application Germany, Jan. 13, 1975, 2501055
Int. Cl.² B29C *17/00*; B29D *7/22*
U.S. Cl. 425—325 **9 Claims**



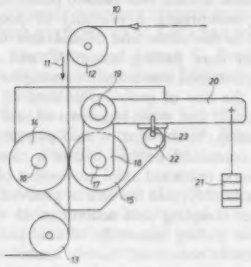
1. Apparatus for making tubing from thermoplastic synthetic material, comprising extruder means having a nozzle from which a tubular parison is extruded in thermoplastic condition; and molding means for converting said tubular parison into a corrugated tube, said molding means comprising two endless strings of mold sections which travel in endless paths each of which includes a straight path portion wherein respective mold sections from each string cooperate to form a travelling mold for the parison coaxially with said nozzle, each of said mold sections having a leading end portion and a trailing end portion provided with respective front and rear guide rollers, and guide means for said guide rollers to guide said mold sections of the respective strings towards each other at an upstream end of said straight path portion and away from each other at a downstream end thereof, said guide means including channel means for said rollers and comprising for each of said strings a main channel in which said front and rear rollers travel and which is provided at least at said upstream end and at said downstream end of said straight path portion with respective channel branches in form of separate guide channels for said front and rear guide rollers, respectively.

4,021,179
APPARATUS FOR THE EDGES OF THERMOPLASTIC WEB

Francois Jean Pira, Edgem, and Jozef Carolus Van Wijk, Lint, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Continuation of Ser. No. 474,989, May 31, 1974, abandoned.
This application Mar. 23, 1976, Ser. No. 669,623
Claims priority, application United Kingdom, June 1, 1973, 26249/73
Int. Cl.² B29C *15/00*, *17/00*
U.S. Cl. 425—369 **9 Claims**

1. Apparatus for edge knurling a moving length of thermoplastic web having two opposite side margins, comprising a backing wheel for supportive engagement with one side of the web margin adjacent each such edge; a freely rotatable knurling wheel for engaging the opposite side of each said web edge margin, said knurling wheel comprising a solid outer cylindrical rim having an exterior knurling pattern thereon composed of a plurality of raised minute surface projections separated by depressions, an inner hub, and means interconnecting said rim and said hub which limit the heat transfer from said rim to said hub; heating means spaced from said rim for heating a peripheral portion of said rim without contacting the same, which portion is remote from the point of engagement with said web to a uniform elevated temperature during knurling to thereby directly conductively heat the contacting web margins as said wheels rotate; and means for biasing said wheels during operation against the corresponding web margin passing through the nip thereof with sufficient force to cause the regions of the

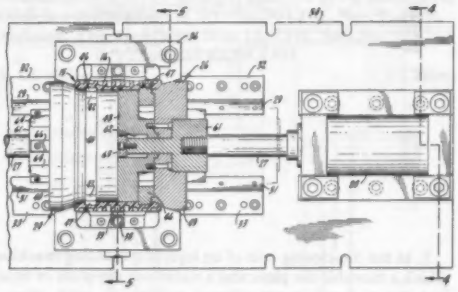


web surface engaged and heated by said projections to be depressed and the intervening regions of said surface to become slightly raised relative to the overall original surface of the web without deformation of the reverse surface as a consequence of said engagement by said projections.

4,021,180
COLLAPSIBLE CORE

Wendal I. Smith, Seymour, Ind., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation of Ser. No. 535,119, Dec. 20, 1974, abandoned.
This application Apr. 14, 1976, Ser. No. 677,067
Int. Cl.² B29C *17/00*; B29D *23/00*
U.S. Cl. 425—392 **6 Claims**



1. A collapsible core assembly capable of forming in a hollow plastic part having at least one open end an internal surface containing a 360° recess, said assembly comprising:

1. a single bi-directional inner core pulling assembly movable axially,
2. an outer mold means for forming said internal surface comprising:
   a. a first mold means having a first position and a second position, wherein said first mold means when in said first position extends a greater radial distance than said first mold means when in said second position, said first mold means comprising a plurality of first and second mold segments, and
   b. a plurality of grooves being equal in number to and for use with each one of said first and second mold segments and sloping radially inward toward the forward end of said collapsible core assembly, wherein said plurality of grooves are located in one of said first mold means and said inner core pulling assembly, and
3. a means for coupling said inner core pulling assembly and said first mold means such that axial movement of said inner core pulling assembly causes a radial and coplanar

movement of said first mold means between said first and said second positions, wherein there is a substantial time delay after an initial movement from said first position toward said second position by said first mold segments when said second mold segments begin to move from said first position toward said second position, said means for coupling comprising a plurality of projections fixedly attached to the other one of said first mold means and said inner core pulling assembly, and arranged to be slidably contained one in each of said plurality of grooves, wherein the size of grooves, utilized by said means for coupling said first mold segments to said inner core pulling assembly, to the size of said plurality of projections slidably contained therein causes a closely coupled response upon rearward axial movement of said inner core pulling assembly, and the size of grooves, utilized by said means for coupling said second mold segments to said inner core pulling assembly, to said plurality of projections slidably contained therein causes said delay in response upon rearward axial movement of said inner core pulling assembly.

4,021,181
TIE ROD CONNECTION FOR DIE CLOSING UNIT OF INJECTION MOLDING MACHINE

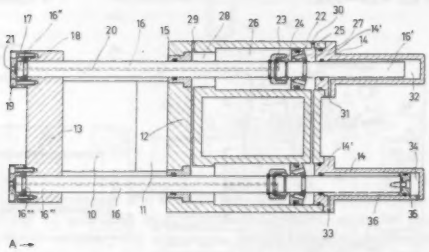
Karl Hehl, Arthur-Hehl-Strasse 32, 7291 Lossburg, Germany

Continuation of Ser. No. 569,886, April 21, 1975, abandoned. This application May 25, 1976, Ser. No. 689,813

Claims priority, application Germany, Apr. 23, 1974, 2419426

Int. Cl.² B29F *1/06;* B30B *1/00*

U.S. Cl. 425—450.1 5 Claims



1. In the die closing unit of an injection molding machine in which a movable die plate and a stationary die plate or equivalent thrust member are aligned relative to each other for opening and closing movement of the injection molding die along at least two parallel tie rods, and in which the closing pressure applied to the die via the die plates and/or thrust members is transmitted through the tie rods as a tension force, a tie rod connection rigidly attaching the tie rods to a die plate or thrust member, the tie rod connection comprising in combination:

a seating bore in the thrust member engaging the outer diameter of the tie rod with a tight fit, the tie rod reaching through said thrust member;

an abutment groove in a portion of the tie rod which protrudes beyond the thrust member, i.e. to the outer side thereof; said groove having a substantially planar face oriented toward said outer side of the thrust member;

a planar abutment face surrounding the tie rod bore on the outer side of the thrust member;

a split abutment ring with parallel axial end faces received inside said groove in such a way that one of the ring end faces bears against said planar groove face and the other ring end face, projecting radially beyond the abutment groove, bears against said abutment face of the thrust member, thereby creating a tension force on the tie rod, if an outwardly directed thrust acts on the thrust member;

means retaining the split abutment ring in the abutment groove;

a clamping cap engaging the protruding portion of the tie rod; and

a plurality of axially oriented clamping bolts which are seated in the clamping cap and engage suitable threaded bores in the thrust member.

4,021,182
ACTUATION APPARATUS FOR THE MOVABLE MOLD HALVES OR PARTS OF AN INJECTION MOLDING MACHINE OR THE LIKE

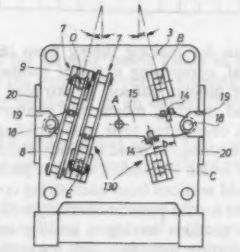
Heinz Resch, St. Gallen, Switzerland, assignor to Gebrueder Buehler AG, Switzerland

Filed Oct. 28, 1975, Ser. No. 626,270

Claims priority, application Switzerland, Oct. 28, 1974, 14407/74

Int. Cl.² B29C *3/02*

U.S. Cl. 425—451.6 10 Claims



1. An actuation apparatus for the movable mold parts of a mold of an injection molding machine, especially for the fabrication of foamed plastic articles, comprising a movable mold support plate, a stationary toggle plate, pairs of toggle-lever rods arranged between the movable mold support plate and the stationary toggle plate symmetrically on opposite sides of a plane of symmetry containing the central longitudinal axis of the injection molding machine, the two toggle-lever rods of each pair being spaced from one another and arranged for operable movement in substantially parallel planes, and driven toggle head means operable to extend and retract said toggle-lever rods, the planes within which the toggle-lever rods operate being disposed obliquely relative to such plane of symmetry with the points of application of the forces of the togglelever rods to said plates, viewed in the plane of each plate, being disposed at the region of the corners of a right-angled quadrilateral, and the substantially parallel planes of the toggle-lever rods on each side of such plane of symmetry being inclined toward each other at substantially equal angles to such plane of symmetry.

4,021,183
ARRANGEMENT AND METHOD OF BURNER IGNITION

Jay C. Gillis, Chicago, and Norman Holcombe, Westmont, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

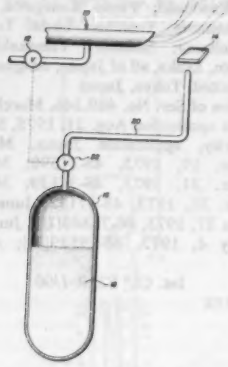
Filed May 7, 1975, Ser. No. 575,412

Int. Cl.² F23G *11/04*

U.S. Cl. 431—2 6 Claims

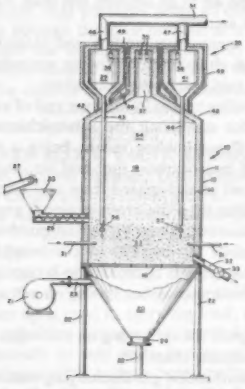
1. In an ignition system for igniting a gas burner including an ignition means for igniting hydrogen which functions as a pilot flame to ignite gas supplied to the gas burner, the improvement comprising an arrangement wherein said hydrogen is

stored as a metal hydride which has an equilibrium decomposition pressure of greater than one atmosphere at ambient



temperature in a pressure vessel having valve means for controlling the flow of hydrogen therefrom.

4,021,184
DILUTE PHASE WASTE INCINERATOR
Robert Joseph Priestley, Westport, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.
Filed Oct. 2, 1975, Ser. No. 619,102
Int. Cl.² F23D *19/00*
U.S. Cl. 431—7 6 Claims

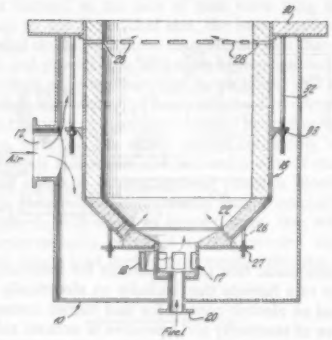


1. In an incineration process conducted in a fluid bed reactor to destroy organic waste material, the steps of fluidizing a bed of inert particulate solids at a space rate of at least about 4 ft./sec. to entirely fill said reactor with a dilute phase fluidized bed, maintaining said fluidized bed at a temperature of at least about 1200°F, introducing said organic waste material into said fluidized bed to burn the organics, essentially completely burning said organic waste material within said reactor, elutriating a substantial amount of bed fines and ash with the exhaust gases from said reactor, separating the solids from the gases in said exhaust gases while minimizing heat loss and returning said hot separated solids directly to the bed thereby conserving the heat generated in said reactor.

4,021,185
COMPOSITIONS AND METHODS FOR HIGH TEMPERATURE STABLE CATALYSTS
Saul G. Hindin, Mendham, and Joseph C. Dettling, Jackson, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.
Division of Ser. No. 423,114, Dec. 10, 1973, Pat. No. 3,956,188. This application Nov. 18, 1975, Ser. No. 632,905
Int. Cl.² F23D *3/40*
U.S. Cl. 431—7 4 Claims

1. A method for the combustion of carbonaceous fuel comprising: forming an intimate admixture of said fuel and air; contacting said fuel air admixture with an oxidation catalyst at a temperature sufficient to combust said admixture, said catalyst having a surface area of at least 20 m^2/g after calcination for two hours at a temperature of 1200° C., said catalyst consisting essentially of (a) a catalytically active calcined composite of alumina, a rare earth metal oxide, and a metal oxide wherein said metal is selected from the group consisted of Cr, W, a Group IVB metal, and mixtures thereof and (b) a catalytically-effective amount of platinum group metal added thereto after calcination of said composite at a temperature of at least 850° C.

4,021,186
METHOD AND APPARATUS FOR REDUCING NO_x FROM FURNACES
Arthur R. Tenner, Parsippany, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.
Continuation of Ser. No. 480,631, June 19, 1974, abandoned, which is a continuation of Ser. No. 304,108, Nov. 1, 1972, abandoned. This application May 15, 1975, Ser. No. 577,751
Int. Cl.² F23M *1/00*
U.S. Cl. 431—10 5 Claims



1. A burner for reducing NO_x produced from nitrogen containing fuels during combustion thereof and receiving a pressurized main air stream required for complete combustion comprising, in combination:

a. combustion chamber means consisting of a single primary combustion chamber having at one end inlet means and a volume of at least one cubic foot for each million BTU per hour fired for providing a minimum amount of residence time in said chamber comprising a first stage for combustion of the fuel and having a length to diameter ratio less than 2 and wherein combustion takes place at sub-stoichiometric conditions;

b. first means at said one end for introducing through said inlet means a first portion of said pressurized main air stream required for complete combustion to said primary combustion chamber under a positive pressure and in an

amount between 65–95% of the stoichiometric amount required to burn said nitrogen containing fuel;

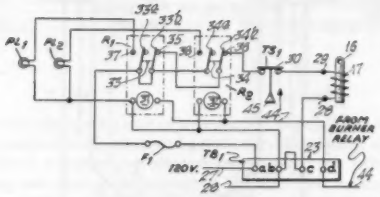
c. second means at said one end for introducing nitrogen containing fuel through said inlet means to said primary combustion chamber within said first portion of said pressurized main air stream introduced by said first means whereby said fuel is mixed with said first portion; and

d. means for completing combustion of the products of sub-stoichiometric combustion in a secondary stage of said primary combustion chamber which is directly adjacent said first stage comprising secondary air inlet means for directly introducing a second portion which comprises the remainder of said pressurized main air stream to the products of sub-stoichiometric combustion of said first portion of said pressurized main air stream and said nitrogen containing fuel, said secondary air inlet means located uniformly around the outlet of the said primary combustion chamber for injecting said second portion such that it completely mixes with said products of sub-stoichiometric combustion whereby NO_x production is substantially reduced.

4,021,187
AUTOMATIC FLUE GATE

Milton Robert Schulte, and George Albert Swartz, both of Quakertown, Pa., assignors to Thermal Developments, Inc., Quakertown, Pa.

Filed Aug. 15, 1975, Ser. No. 604,904
Int. Cl.² F23N *3/00, 3/02*
U.S. Cl. 431—20 **9 Claims**

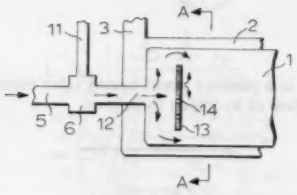


1. An automatic flue gate apparatus for installation in the outlet flue of a furnace that includes an electrically operated burner and an electric control for said burner connected to a first source of electricity and operative to actuate said burner, said flue gate apparatus comprising a gate movable between a flue-opening and a flue-closing position, means biasing said flue gate into flue-opening position, electrically operated actuating means for actuating the flue gate into flue-closing position when said actuating means are supplied with electric current from a second source of electricity, electric control mechanism operative to shut off electric current supply to said electrically operated actuating means, and an activating device for said electric control mechanism energized by electric current from said electric control for the burner so that the flue gate is normally actuated into flue-closing position but is automatically biased into flue-opening position upon energization of said activating device for said electric control mechanism by electric current from said electric control for the burner, thereby to ensure that normal electrical failure in said control mechanism will permit said flue gate to be biased open and will not interfere with the functioning of the burner.

4,021,188
BURNER CONFIGURATIONS FOR STAGED COMBUSTION

Kazuo Yamagishi, Urawa; Ichiro Nakamachi, Abiko; Masaaki Nozawa, Yokohama; Tsunenori Tokumoto, Yokosuka; Shoichi Yoshie, Kawasaki; Yasuo Kakegawa, Tokyo; Isamu Kikuchi, Yokohama; Yoshihisa Iseda, Tokyo; Yoshihiro Kanno, Yokohama; Sadanori Yamazaki, Tokyo, and Masanobu Sato, Asaka, all of Japan, assignors to Tokyo Gas Company Limited, Tokyo, Japan

Continuation of Ser. No. 450,246, March 11, 1974, abandoned. This application Aug. 21, 1975, Ser. No. 606,605
Claims priority, application Japan, Mar. 12, 1973, 48-28774; Mar. 19, 1973, 48-31590; Mar. 19, 1973, 48-31591; Mar. 31, 1973, 48-37139; Mar. 31, 1973, 48-37141; Mar. 31, 1973, 48-37142; June 27, 1973, 48-76439[U]; June 27, 1973, 48-76440[U]; June 27, 1973, 48-76442[U]; July 4, 1973, 48-79539[U]; Aug. 17, 1973, 48-91682
Int. Cl.² F23R *1/00*
U.S. Cl. 431—158 **35 Claims**



1. A burner configuration adapted to be positioned in a furnace for carrying out staged combustion in order to decrease nitrogen oxides (NOx) during the combustion of hydrocarbon fuel with air, comprising:

a. a combustion chamber and means for supplying into one end of said combustion chamber a mixture of hydrocarbon fuel and air in an amount less than 70 % of the stoichiometric amount;

b. flow path means surrounding and extending along said combustion chamber for flowing secondary air around and along said combustion chamber;

c. a flame holding means in said one end of said combustion chamber for stabilizing the substoichiometric combustion, said flame holding means being a nozzle for said mixture of hydrocarbon fuel and air, and a foraminate plate in front of and spaced from said nozzle, and having a size smaller than the cross-sectional area of said combustion chamber, whereby partial combustion gas containing mainly H_2 and CO as combustible components and substantially no hydrocarbon is obtained;

d. said combustion chamber having an exit at the other end thereof;

e. said flow path means having an exit adjacent said exit of said combustion chamber;

f. a partial combustion gas discharging means at said exit of said combustion chamber for varying the pattern of the flow of said partial combustion gas during its discharge from said combustion chamber exit by converting the enthalpy of said partial combustion gas into kinetic energy;

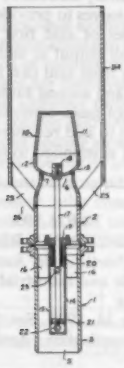
g. a secondary air discharging means at said exit of said flow path means for varying the pattern of the flow of said secondary air; and

h. at least one of said discharging means varying the flow of the gas flowing therethrough to mix burned gas from the space around said exit of said combustion chamber into the partial combustion gas and secondary air.

4,021,189
GAS BURNER

Ferris George Swann, and Martin Josef Beckmann, both of Edmonton, Canada, assignors to Porta-Test Manufacturing Ltd., Edmonton, Canada

Filed Jan. 16, 1975, Ser. No. 541,532
Int. Cl.² F23D *13/20*
U.S. Cl. 431—202 **2 Claims**



1. In a burner comprising an axially movable substantially free floating coanda valve body positioned at the outlet of a tubular flow conduit for regulating the flow of combustible gas out of the outlet so as to maintain a substantially constant back-pressure within the conduit, the improvement which comprises:

means connecting the coanda valve body and the conduit for providing substantially equal dampening of the axial movement of the valve body toward and away from the outlet, thereby reducing "chattering" of the valve body and improving the stability of the flame; and

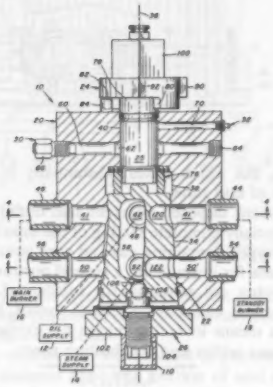
said burner having one or more minute passages, extending from the interior of the flow conduit and directed toward the valve body, said passages being so dimensioned that gas passing through the flow conduit at a low flow rate, escapes from the conduit at sufficiently high velocity when the valve body is seated, to cause the escaping gas to follow the coanda valve body surface and entrain air.

4,021,190
BURNER BLOCK VALVE ASSEMBLY

Fred D. Dickson, Sulphur Springs, Tex., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 20, 1975, Ser. No. 606,047
Int. Cl.² F23Q *9/08*
U.S. Cl. 431—280 **4 Claims**

1. In a single tip burner wherein the tip is in continuous operation except for servicing or repairing during which time a stand-by burner tip is used to carry the load, a burner block valve assembly providing a single unit control for routing oil and steam selectively to said main burner or said stand-by burner, comprising: a valve body; a bore axially formed in the body; a circular valve plug disposed in the bore, said plug being rotatable about the axis of the bore successively between a main burner ignition position, a joint burner ignition position and a stand-by burner position; a first pair of angularly spaced outlets in the valve body communicating with the bore and adapted to be respectively connected to a main burner oil line and a stand-by burner oil line; a first inlet in the valve body communicating with the bore and spaced between the first pair of outlets, said first inlet adapted to be connected to the oil supply; a second pair of angularly spaced outlets formed in the valve body in axially spaced relationship to the first pair of outlets, said second pair of outlets communicating with the bore and adapted to be respectively connected to a main steam line and a stand-by steam line; a second inlet in the valve body communicating with the bore and spaced between the second pair of outlets, said second inlet adapted to be connected to the steam supply; a first radial slot formed in the side of the valve plug, the inner surface of said first radial slot being spaced a first distance from the axis and providing fluid communication in said main burner ignition position between the oil supply on the main burner oil line while blocking the stand-by oil line, in said joint burner ignition position providing fluid communication between the stand-by burner oil line commonly with the main burner oil line and with said oil supply, and in the stand-by burner ignition position blocking said main burner oil line and directly fluidly connecting said oil supply and said stand-by burner oil line with oil being uninterruptedly supplied to the first radial slot through the oil



inlet during movement of the plug between positions; a second radial slot formed in the side of said valve plug in spaced relationship to the first radial slot, the inner surface of said second radial slot being spaced closer to the axis than said first radial slot and providing in said main burner ignition position fluid communication between said steam supply and said main burner steam line while blocking said stand-by burner steam line, in said joint burner ignition position providing fluid communication between the steam supply commonly with said stand-by burner steam line and said main burner steam line, and in said stand-by burner ignition position blocking said main burner steam line and directly fluidly connecting said steam supply to said stand-by burner steam line with steam being uninterruptedly supplied to the second radial slot through the steam inlet during movement of the plug between positions.

4,021,191
REDUCTION OF POLLUTANTS IN GASEOUS HYDROCARBON COMBUSTION PRODUCTS

Paul G. La Haye, Cape Elizabeth, Maine, assignor to Aqua-Chem, Inc., Milwaukee, Wis.

Division of Ser. No. 302,133, Oct. 30, 1972, Pat. No. 3,885,903. This application Mar. 5, 1975, Ser. No. 555,412
Int. Cl.² F23D *15/02*
U.S. Cl. 431—353 **11 Claims**

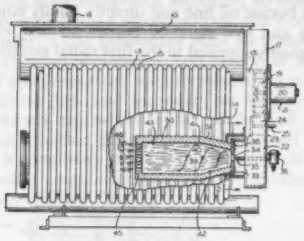
1. Apparatus for burning fuel in a manner to substantially reduce pollutants in the exhaust gases therefrom said apparatus comprising:

first means defining a combustion zone having an inlet and an outlet,

second means adjacent said inlet for injecting into said combustion zone fuel and a portion of an oxygen contain-

ing gas required for stoichiometric combustion to produce a fuel-rich core stream of incompletely oxidize gaseous combustion flowing toward said outlet,

third means for injecting into said zone a first portion of the remainder of the oxygen containing gas required for substantial stoichiometric combustion of said fuel said third means being operative for injecting said oxygen at an angle relative to said core stream and as a sheath of gas which surrounds said core stream and is substantially unmixed therewith over at least a part of said core stream



length, but which mixes substantially in a downstream region of said zone,

fourth means disposed adjacent said outlet for promoting substantially complete mixing of the unmixed portions of said oxygen containing gas and core stream,

fifth means for introducing a second portion of the oxygen containing gas required for substantial stoichiometric combustion adjacent said fourth means, and

said first means including means for extracting heat from the gases within said combustion zone.

4,021,192

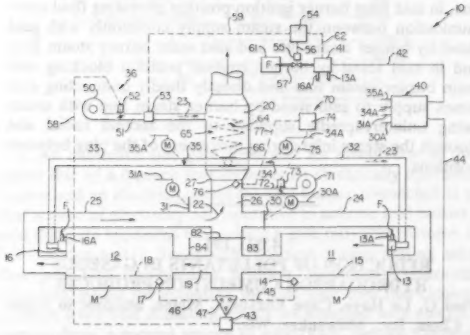
FURNACE SYSTEM FOR AND METHOD OF MELTING AND PREHEATING METAL

Jack A. Ferguson, Richmond, Va., and Clarence D. Korn, Florence, Ala., assignors to Reynolds Metals Company, Richmond, Va.

Filed Dec. 22, 1975, Ser. No. 643,516

Int. Cl.² F27B *14/00*

U.S. Cl. 432—13 **20 Claims**



1. A furnace system comprising, a first and a second furnace serving alternately as a melting and a preheating furnace, said first furnace having a first variable output burner and a first temperature sensor for sensing temperature of a first charge of metal therein, said second furnace having a second variable output burner and a second temperature sensor for sensing temperature of a second charge of metal therein, a connecting duct connecting said furnaces together, a recuperator, a first and a second hot gas discharge duct from said first and second furnaces respectively to said recuperator, a first and a second valve in said first and second hot gas discharge ducts respectively for controlling hot gas flow therethrough, a first and a second combustion air duct from said recuperator to said first and second burner respectively, a first and a second valve in said first and second combustion air duct respectively for controlling flow of combustion air therethrough, means for supplying combustion air to said recuperator to preheat said combustion air by hot gases provided therethrough from one of said hot gas discharge ducts, and control means for said furnace system operatively associated with said burners, temperature sensors, and valves to provide preheated combustion air to said first burner of said first furnace with said first burner operating at full output to melt a first charge of metal therein with hot gases from said first furnace flowing through said connecting duct and second furnace to preheat said second charge and said hot gases continuing through said second hot gas discharge duct to said recuperator to also preheat said combustion air which is supplied to said first burner.

4,021,193

SPOUTED-FLUIDIZED BED REACTOR SYSTEMS

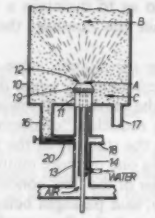
Percy Lloyd Waters, North Ryde, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed July 24, 1975, Ser. No. 598,823

Claims priority, application Australia, July 26, 1974, 8342/74

Int. Cl.² F27B *15/00*; **F26B** *17/00*

U.S. Cl. 432—58 **13 Claims**



1. A spouted-fluidised bed reactor for use in the treatment of materials, comprising:

a deep particulate bed;

at least one nozzle projecting upwardly into a lower region of said bed; and

means to cause a fluid and combustible material to pass into the bed through said nozzle, said fluid having sufficient velocity to cause an inverted cone shaped region of said bed, immediately above said nozzle, to act as a spouted bed, and to cause an upper region of said bed to become fluidised, said bed containing a stagnant region beneath said inverted cone shaped region.

4,021,194

INSTALLATION FOR THE DE-DUSTING OF HOT GASES

Gustav Weislehner, Dotternhausen, Germany, assignor to Portlandzementwerk Dotternhausen Rudolf Rohrbach KG, Balingen, Germany

Filed Nov. 22, 1974, Ser. No. 526,410

Claims priority, application Germany, Dec. 17, 1973, 2362622

Int. Cl.² F27D *15/02*

U.S. Cl. 432—78 **3 Claims**

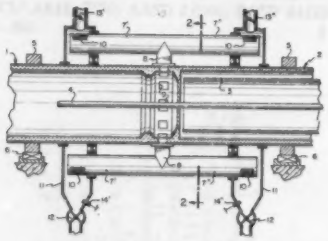
1. An installation for the dedusting of hot exhaust air formed during the cooling of products emanating from a cement-, lime-, or dolomite furnace, comprising:

a product cooler receiving said products being connected to the outlet of said furnace; means for conveying cool air to said product cooler for cooling said products; an exhaust

air chamber in said product cooler for removal of hot and dustcontaining exhaust air formed by the heated and dust-enriched air produced during the cooling of the products;

a regeneratively operating heat exchanger including a rotatable drum having an axis of rotation; a plurality of heat exchange plates in said drum and being rotatable therewith, said plates having large surface areas and heat storage capacities;

at least one exhaust air conduit extending from said exhaust air chamber and communicating in a direction essentially parallel with said axis of rotation directly with a first half of said heat exchanger for conveying the hot exhaust air from said exhaust air chamber through said conduit into said exchanger and cooling said exhaust air in the latter, wherein the introduced cooling air is heated to a temperature reducing towards the outlet end of said cooler and said at least one exhaust air conduit comprises a plurality of mutually independent tube conduits interconnecting the exhaust air chamber of said cooler at a plurality of locations in axial spacing therealong and connected to



said heat exchanger, said tube conduits conveying a plurality of air streams of differing temperatures to said heat exchanger at a plurality of locations spaced along the direction of rotation of said rotatable drum so as to cause the heat exchange surfaces of the plates of said heat exchanger to initially be contacted by the lowest-temperatured and finally by the highest-temperatured exhaust air from said cooler as viewed in the direction of rotation of said heat exchanger;

at least one infeed conduit for cooling air being connected to the other half of said heat exchanger, for conveying cooling air in counterflow to the exhaust air flow in said exhaust air conduit;

a blower connected to said at least one cooling conduit to deliver the cooling air;

a fabric filter; and at least one conduit connecting said heat exchanger with said fabric filter whereby the cooled and still dust-containing exhaust air is conveyed from said heat exchanger through said last-mentioned conduit into said fabric filter for dedusting in the latter further conveyance thereof as purified exhaust air.

4,021,195

PLANETARY COOLER SYSTEM FOR ROTARY DRUMS SUCH AS KILNS

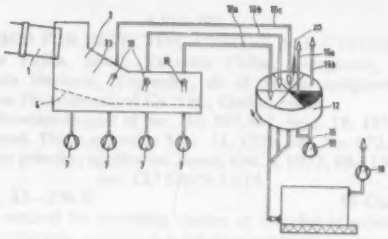
Karl Jens Sylvest, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Mar. 15, 1976, Ser. No. 666,915

Claims priority, application United Kingdom, Mar. 18, 1975, 11248/75

Int. Cl.² F27D *23/00;* **F27B** *7/38*

U.S. Cl. 432—80 **23 Claims**



1. A planetary cooler system for cooling hot material exiting from the discharge portion of an inclined rotary drum such as a rotary kiln which comprises:

a. a plurality of cooler tubes mounted in planetary fashion about the material discharge portion of said drum with the axis of each cooler tube substantially parallel to the axis of the drum;

b. a conduit communicating the discharge portion of the rotary drum with each cooler tube for the passage of hot material therethrough, each cooler tube being divided into at least two sections, a first section extending away from said conduit in a direction generally upstream of the flow of material inside the kiln, the second section extending away from the conduit in a direction generally downstream of the flow of material in the kiln, and each cooler tube section having a material inlet end portion communicating with said conduit and a material outlet end portion; and

c. means associated with the material outlet end portion of each cooler tube section to permit the entrance of cooling air therein and to discharge hot material from each cooler tube section.

4,021,196
PROCESS FOR PRINTING FIBER PRODUCTS OF ACRYLIC FIBER BLENDS

Eichiro Ueno, Wakayama; Hideo Kawasaki, Moriyama, and Shozo Shigita, Hirakata, all of Japan, assignors to American Cyanamid Company, Stamford, Conn.

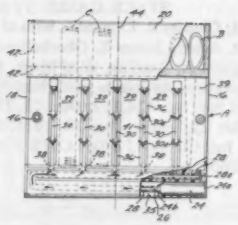
Filed Dec. 13, 1973, Ser. No. 424,410
Int. Cl.² D06P *3/82*
U.S. Cl. 8—21 A **10 Claims**

1. A process for dyeing a product of a fiber blend of from about 25 to 75 weight percent of an acrylic fiber substantially free of acid dye sites and, correspondingly from about 75 to 25 weight percent of an acid dyeable fiber, which process comprises printing said fiber product with a printing paste containing a monosulfonic acid dye having an inorganicity/organicity ratio less than 4 and thereafter steaming the printed fiber product, whereby both components are dyed with said dye.

4,021,197
HAIR STYLIST'S ACCESSORY

Lawrence L. Brooks, 4415 Lancewood, Irvine, Calif. 92715

Filed June 21, 1976, Ser. No. 698,041
Int. Cl.² A61L *7/00*; A45D *27/46*; B65D *81/28*
U.S. Cl. 21—84 **4 Claims**



1. A portable hair stylist's accessory for maintaining shears, combs and the like in a sterile condition prior to the use thereof, said accessory comprising:

a. a first rectangular sheet of pliable material that has a top edge, bottom edge and first and second side edges, said sheet having first and second oppositely disposed side surfaces, a rectangular flap of pliable material that extends from said top edge over a first part of said first surface, and a second rectangular flap of pliable material that extends from said bottom edge over a second portion of said first surface of said first sheet;

b. a cylindrical container that holds a quantity of pressurized disinfectant, said container having first and second ends;

c. normally closed spring-loaded valve means on said first end of said container, wiith said valve opening when said container is moved longitudinally towards said valve means;

d. a first tube connected to said spring-loaded valve means, said first tube having a first closed end;

e. a plurality of spaced parallel second tubes normally disposed to said first tube and in communication with the interior thereof, said second tubes having a plurality of longitudinally spaced sets of apertures therein;

f. a second sheet of pliable material that overlies a third portion of said first side of said first sheet intermediate said first and second portions, and edge areas of said first and second flaps extending over said second sheet;

g. first means so bonding said second flap to said second sheet and said second sheet to said first sheet that said second flap and second sheet cooperate to define an elongate compartment in which said container, valve means and first tube is disposed;

h. second means so bonding said second sheet to said first sheet that said first and second sheets cooperate to define a plurality of pouches normally disposed to said compartment and in which pouches said shears and combs may be removably disposed, when inserted therein through an opening in said pouches adjacent said first flap, and said pouches having passage means defined therebetween in which said second tubes are disposed with said sets of apertures in communication with the interiors of said pouches; and

i. third means for removably and sealingly securing free edge areas of said first flap to said first part of said first surface and an edge area of said second sheet most adjacent said first flap to cooperate with the interiors of said pouches to define a confined space in which said shears and combs are disposed in positions to be subjected to said pressurized disinfectant when said container is moved longitudinally towards said spring loaded valve means.

4,021,198
METHOD FOR DETECTING CYSTINE AND CYSTEINE

Tadashi Fujita, Sakai; Takehisa Chiba, Amagasaki, and Masato Horiuchi, Toyonaka, all of Japan, assignors to Santen Pharmaceutical Co. Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 507,467, Sept. 19, 1974, abandoned. This application Mar. 31, 1976, Ser. No. 672,348
Claims priority, application Japan, Oct. 8, 1973, 48-113070
Int. Cl.² G01N *33/16*
U.S. Cl. 23—230 B **16 Claims**

1. A method for detecting cystine or cysteine in solution, which comprises contacting a solution containing cystine or cysteine with a reagent comprising

i. a reducing agent which reduces cystine to cysteine and releases sulfide ion (S^{2-}) by itself or by reaction with cysteine; and

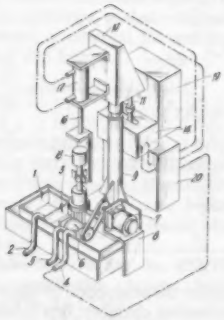
ii. a metallic compound which liberates nickel ion or cobaltous ion,

each of cystine and cysteine forming a mixed ligands complex with the nickel ion or cobaltous ion and sulfide ion (S^{2-}) with the formation of a brown color.

4,021,199
AUTOMATIC CLEANING APPARATUS FOR ELECTRODES OF pH METER

Satoshi Mukae, and Kiyosi Yokokawa, both of Shimonoseki, Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,296
Claims priority, application Japan, July 4, 1974, 49-79189[U]
Int. Cl.² A46B *13/04*; G01N *27/26*
U.S. Cl. 23—253 A **1 Claim**



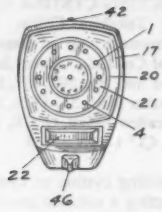
1. An apparatus for automatically cleaning the electrodes of a pH meter comprising a measuring tank containing a sample solution supplied from a solution to be measured, a cleaning

tank disposed adjacent to said measuring tank and having therein a cleaning brush mounted on a rotary shaft for rotation therewith, said cleaning brush being in contact with said electrodes, means for supporting said electrodes of said pH meter for vertical movement, and means for supporting said electrode supporting means for horizontal swinging movement, whereby said electrodes of said pH meter are movable between the pH measuring position in said measuring tank and the cleaning position in said cleaning tank.

4,021,200
ELECTRONIC DIGITAL RADIAL AND ELECTRO IMMUNODIFFUSION CALIBRATING VIEWER

Walter Farris, 19193 Parkside, Detroit, Mich. 48221

Filed Sept. 29, 1975, Ser. No. 617,322
Int. Cl.² G01B *11/02*; G01N *33/16*
U.S. Cl. 23—253 R 9 Claims

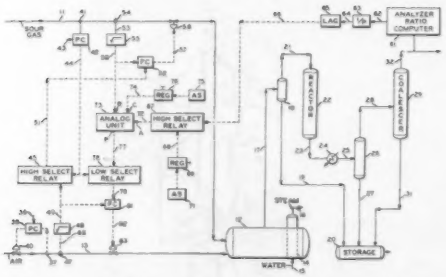


1. A device for measuring and displaying the magnitude of an immunodiffusion test, comprising in combination a base member and a top member, said top member having a pair of cross hairs, one of which is stationary and the other of which in moveable, a digital meter panel for indicating relative movement of said moveable cross hair, motor means to move said moveable cross hair, eletrical circuits connected to said motor means, and a potentiometer in said circuits and responsive to the movement of said moveable cross hair for effecting a digital read out on said digital panel.

4,021,201
CONTROL SYSTEM FOR SULFUR PROCESS

Lucien H. Vautrain, and Herbert A. Ems, both of Sweeny, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 526,939, Nov. 25, 1974, Pat. No. 3,985,864. This application July 1, 1976, Ser. No. 701,726
Int. Cl.² C01B *17/04*
U.S. Cl. 23—253 A 10 Claims

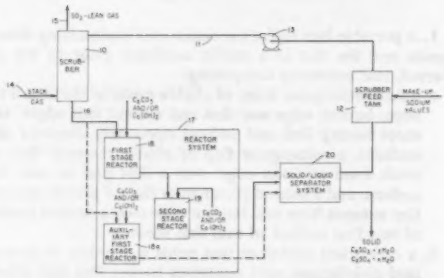


1. Apparatus for the production of sulfur comprising means defining a combustion chamber, first conduit means for passing a first stream containing hydrogen sulfide into said combustion chamber, second conduit means for passing a second stream containing oxygen into said combustion chamber to therein convert a portion of the hydrogen sulfide of said first stream to sulfur dioxide, a reactor, third conduit means for withdrawing the resulting combustion products from said combustion chamber and passing the withdrawn combustion products to said reactor, fourth conduit means for withdrawing the reaction effluent from said reactor, means for separating the thus withdrawn reaction effluent into a liquid sulfur stream and a stripped gas stream, means for measuring the pressure of said first stream and establishing a first signal representative thereof, means for measuring the flow rate of said first stream and establishing a second signal representative thereof, means for determining the ratio of the concentration of hydrogen sulfide in said stripped gas stream to the concentration of sulfur dioxide in said stripped gas stream and establishing a third signal representative thereof, means for establishing a fourth signal responsive to said second and third signals, and means for controlling the rate of flow of said second stream responsive to the lower of said first and fourth signals to maintain the desired ratio of hydrogen sulfide to oxygen fed to said combustion chamber despite any changes in the pressure of said first stream and any variation in the concentration of hydrogen sulfide in said first stream and in the concentration of oxygen in said second stream.

4,021,202
APPARATUS FOR REMOVING SULFUR DIOXIDE FROM STACK GASES

Edwin L. Field; Charles R. Lamantia, both of Lexington; Richard R. Lunt, Acton; James E. Oberholtzer, Lexington, and James R. Valentine, Reading, all of Mass., assignors to Combustion Equipment Associates, Inc., New York, N.Y.

Division of Ser. No. 424,212, Dec. 13, 1973, Pat. No. 3,944,649. This application Jan. 28, 1976, Ser. No. 653,147
Int. Cl.² B01J *1/00*; C01B *17/00*
U.S. Cl. 23—260 2 Claims



1. An apparatus for removing sulfur dioxide from stack gases, comprising in combination

a. mass transfer means for contacting SO_2-containing gases with a SO_2-absorbent solution containing at least one alkali metal compound and including means to separately withdraw SO_2-lean gases and spent absorbent wash-liquid effluent containing reactant bisulfite, sulfite and sulfate salts of said alkali metal;

b. first stage reactor means for reacting said salts of said alkali metal in said spent wash liquid effluent under conditions to favor the precipitation of sulfate ions as calcium salts in the presence of sulfite ions along with the precipitation of some sulfite ions as calcium salts to form a first solids/liquid slurry;

c. means to introduce a controlled amount of at least one calcium compound into said first stage reactor;

d. a second stage reactor separate from said first stage reactor for reacting a portion of said slurry from said first stage reactor under conditions to complete the precipitation of a predetermined amount of said bisulfite and sulfite alkali metal salts as calcium sulfite to form a second solids/liquid slurry;

e. means to introduce a controlled amount of at least one calcium compound into said second stage reactor;

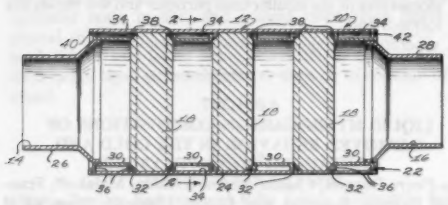
f. solids/liquid separator means adapted to separate solids from said first and second slurries;
g. first slurry transfer means arranged to transfer a portion of said first slurry from said first stage reactor directly to said second stage reactor and the remainder of said first slurry from said first stage reactor directly to said solids/-liquid separator means;
h. second slurry transfer means arranged to transfer said second slurry from said second stage reactor to said solids/liquid separator means; and
i. means to recycle liquid from said solids/liquid separator means as at least a portion of said SO_2-absorbent wash liquid.

4,021,203

CATALYTIC CONVERTER FOR PURIFYING GASES

William R. Givens, Hoffman Estates, and Charles D. Lemme, Oak Park, both of Ill., assignors to Maremont Corporation, Chicago, Ill.

Division of Ser. No. 419,132, Nov. 26, 1973, Pat. No. 3,969,083. This application Jan. 14, 1976, Ser. No. 649,512
The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.
Int. Cl.² B01J *8/02, 35/04;* **F01N** *3/15*
U.S. Cl. 23—288 FC **7 Claims**



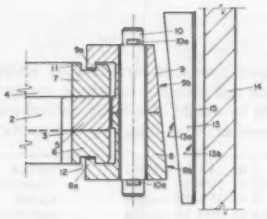
1. A catalytic converter comprising:
an annular casing structure having an inlet for receiving a flow of exhaust gases from an automotive engine or the like and an outlet for discharging the gases received in said inlet after flowing through said casing structure;
catalyst carrier means of porous, inert, solid, refractory material in skeletal form providing a multiplicity of generally parallel closely adjacent flow passages each extending throughout the longitudinal extent thereof;
catalyst means deposited on surfaces of macropores communicating with said passages and surfaces defining said passages;
said casing structure having a cylindrical section between the inlet and outlet thereof within which said catalyst carrier means is disposed;
said catalyst carrier means being generally cylindrical in form and having an exterior diameter generally equal to the interior diameter of said cylindrical casing section;
means fixed at the ends of said casing section against longitudinal movement with respect thereto in directions longitudinally outwardly of said casing section for mounting said catalyst carrier means within said casing structure in a manner which substantially prevents flow of gases through said casing structure within an annular volume adjacent the interior periphery thereof throughout the longitudinal extent of said section and confines the flow of gases through an inner volume encompassed thereby within which substantially the entire extent of said catalyst carrier means is disposed,
said catalyst carrier means having relieved face portions disposed within said annular volume;
said mounting means including an annular barrier wall mounted within said cylindrical section adjacent each relieved face portion,
annular cushioning means including a ring formed of compressed metallic wires disposed between each annular barrier wall and face portion,
said barrier walls being mounted within said cylindrical section in compression applying relation to the associated cushioning means,
each barrier wall and associated face portion including cushioning means engaging annular surfaces disposed with respect to one another so that the compression of the associated cushioning means is transmitted to the associated face portion with a directional component radially inwardly with respect to said catalyst carrier means and a directional component longitudinally inwardly with respect to said catalyst carrier means.

4,021,204

METHOD OF MANUFACTURING A GRILL-TYPE SUPPORT COMPRISING TWO DIFFERENT MATERIALS AND CAPABLE OF BEING INITIALLY RIGID, WHILE ALLOWING DIFFERENTIAL THERMAL EXPANSIONS AFTER INSTALLATION

Franco Straffi, Dresano (Milan), Italy, assignor to Breda Termomeccanica S.p.A., Milan, Italy

Filed Sept. 25, 1975, Ser. No. 616,665
Claims priority, application Italy, June 9, 1975, 24128/75
Int. Cl.² B21D *53/02;* **B23P** *15/26*
U.S. Cl. 29—157.3 R **9 Claims**



1. A method of manufacturing a grill-type support suitable to act as a support and tube spacing member for steam generators (particularly natural circulation steam generators for pressure water reactors), heat exchangers and the like, said support including an outer frame enclosing a lattice grid, said grid comprising strips having a determined thermal expansion, said frame being made of another material having different thermal expansion, characterized in that during assembling the outer frame is connected to the strips so as to be fast therewith and remain so for all the time required for manufacture, transport and erection, whereas as soon as said generator is set to work said frame of different material from the strips can move relative to said strips, so that, while surrounding and supporting such strips, a different thermal expansion is allowed for said strips and frame.

4,021,205

SINTERED POWDERED FERROUS ALLOY ARTICLE AND PROCESS FOR PRODUCING THE ALLOY ARTICLE

Takayuki Matsuda; Yoichi Shimizu; Hiroki Shimizu; Kazushi Imazaki, and Setsuo Nii, all of Okaya, Japan, assignors to Teikoku Piston Ring Co. Ltd. and Honda Motor Co., Ltd., both of Tokyo, Japan

Filed June 8, 1976, Ser. No. 693,770
Claims priority, application Japan, June 11, 1975, 50-69571; Feb. 9, 1976, 51-12362
Int. Cl.² B22F *3/00*
U.S. Cl. 75—246 **7 Claims**

1. A process for producing a sintered powdered ferrous alloy article having high heat resistance and abrasion resistance, comprising:

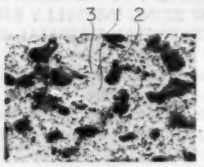
admixing (1) 5 to 30% by weight of finely divided component alloy which consists of the following composition,

1 to 4% by weight	carbon
10 to 30% by weight	chromium
2 to 15% by weight	nickel
10 to 30% by weight	molybdenum
20 to 40% by weight	cobalt
1 to 5% by weight	niobium
the balance	iron,

(2) 0.8 to 2% by weight of finely divided carbon and (3) the balance consisting of a finely divided ferrous base metal;

compression molding said admixture under a pressure of 4 to 6 metric tons/cm², and;

sintering said molded admixture in a reducing atmosphere at a temperature of 1050° to 1150° C.



(x 100)

7. A sintered powdered ferrous alloy article having high heat resistance and abrasion resistance, comprising:

1. 5 to 30% by weight of a finely divided component alloy which consists of the following composition,

1 to 4% by weight	carbon
10 to 30% by weight	chromium
2 to 15% by weight	nickel
10 to 30% by weight	molybdenum
20 to 40% by weight	cobalt
1 to 5% by weight	niobium
the balance	iron,

2. 0.8 to 2% by weight of finely divided carbon, and;

3. the balance consisting of finely divided ferrous base metal;

admixed together, compression-molded under a pressure of 4 to 6 metric tons/cm² and, then, sintered in a reducing atmosphere at a temperature of 1050 to 1150° C;

the particles of said finely divided component alloy being dispersed in a matrix component formed from said finely divided carbon and ferrous base metal, and being firmly bonded to said matrix with bonding phases formed around said particles and consisting of portions of said matrix and portions of said finely divided component alloy diffused into said portions of said matrix.

4,021,206
SEPARATING COAL PARTICLES FROM WATER

Leo J. Th. J. Huberts, The Hague, and Eke Verschuur, Amsterdam, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 3, 1976, Ser. No. 654,816

Claims priority, application United Kingdom, Feb. 10, 1975, 5482/75; Oct. 31, 1975, 45156/75

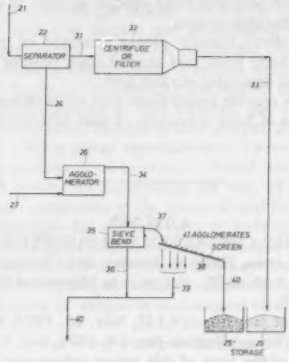
Int. Cl.² C10L *5/00, 5/14*

U.S. Cl. 44—10 R **7 Claims**

1. A process for separating coal particles in a coal/water slurry from water of the slurry to form a relatively dry and substantially ash-free, dust-free product of larger coal particles and agglomerates of smaller coal particles comprising the steps of:

a. supplying the slurry to a separator wherein the larger coal particles together with a relatively small quantity of water are separated from the slurry as supplied, so that a second slurry remains comprising the smaller coal particles and a relatively large quantity of water;

b. passing the second slurry to an agglomeration device;



c. introducing a relatively small quantity of binder and the second slurry into the agglomeration device so that agglomerates of the smaller coal particles and the binder are formed; and

d. separating the agglomerates from the water.

4,021,207
LIQUID HYDROCARBON COMPOSITIONS OF IMPROVED BEHAVIOR IN THE COLD AND CONTAINING DIENE POLYMERS

Jean-Pierre Durand, Chatou; Bernard Aubin, Malakoff; Francois Dawans, Bougival, and Gilbert Chapelet, Bron, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Pertolieres Elf, Rueil-Malmaison, France

Filed Nov. 27, 1974, Ser. No. 527,803

Claims priority, application France, Nov. 28, 1973, 73.42470

Int. Cl.² C10L *1/18*

U.S. Cl. 44—62 **10 Claims**

1. A composition of petroleum middle distillate of lowered limit filterability temperature, comprising a major amount of a petroleum middle distillate and from 10 to 1,000 g/m³ of at least one hydrogenated copolymer of 1,3-butadiene and at least one different conjugated aliphatic diolefin selected from the group consisting of isoprene and 1,3-pentadiene, wherein said hydrogenated copolymer contains from 20 to 90% of butadiene units and from 10 to 80% of units derived from said different conjugated diolefin, and has a microstructure, as determined before hydrogenation, of at least about 90% of 1,4-addition units, a number average molecular weight of 500 to 20,000 and an olefinic unsaturation ratio of not more than 40% of the units constituting the polymeric chain.

4,021,208
ABRASIVE ARTICLE

Werner Oberbichler, Schwaz, Austria, assignor to Tyrolit-Schleifmittelwerk Swarovski K.G., Austria

Continuation of Ser. No. 386,426, Aug. 7, 1973, abandoned. This application May 16, 1975, Ser. No. 578,343

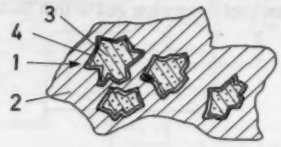
Claims priority, application Austria, Aug. 7, 1972, 6782/72

Int. Cl.² B24D *3/24*

U.S. Cl. 51—295 **1 Claim**

1. In an abrasive article comprising abrasive grains, a binder and at least one active filler, the improvement wherein said active filler is substantially located in the abrasive zone of said

abrasive grains, said abrasive grains being porous and the pores of said abrasive grains being filled with said active filler to at least about 20% of the pore space, said active filler being



selected from the group consisting of sulfur, a metallic sulfide and a metallic halide and said abrasive being porous corundum.

4,021,209

ARAMID FIBER REINFORCED ABRASIVE WHEEL

Howard J. R. Binkley, North Tonawanda, N.Y., assignor to Federal-Mogul Corporation, Detroit, Mich.

Filed July 23, 1975, Ser. No. 598,302

Int. Cl.² C09K *3/14*

U.S. Cl. 51—298 A **1 Claim**

1. An abrasive wheel comprising a core portion and a grinding surface portion comprising a mass of abrasive material, synthetic resin binder, and aramid reinforcing fibers said aramid reinforcing fibers are in the form of a woven open-mesh fabric, said fabric being positioned as at least one uniform radial layer perpendicular to the axis of rotation of said wheel.

4,021,210

ADSORPTION SYSTEM

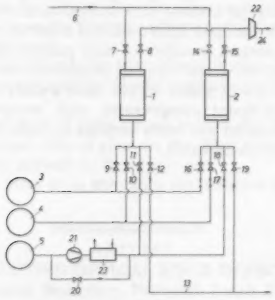
Martin Streich, Socking, and Fritz Jakob, Achmuhle, both of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Dec. 19, 1975, Ser. No. 642,601

Claims priority, application Germany, Dec. 20, 1974, 2460513

Int. Cl.² B01D *53/04*

U.S. Cl. 55—26 **16 Claims**



1. In an adsorption-desorption process for separating gaseous mixtures comprising passing a stream of crude gaseous mixture under superatmospheric pressure through a first adsorber, withdrawing from said first adsorber a stream of product gas depleted in undesired component; switching the stream of crude gaseous mixture to a second adsorber when the impurity concentration at a given location before the exhaust end of the first adsorber exceeds a given value in the gas; after the crude gas stream is switched away from said first adsorber, decompressing said first adsorber in at least one decompression stage to release residual product gas therefrom; and employing said residual product gas to re-pressurize an adsorber,

the improvement which comprises conducting said decompressing in at least two separate decompression stages thereby lowering the pressure in each stage, collecting the residual product gas from each decompression stage in separate storage vessels having different pressures, withdrawing residual product gas from the storage vessel having the lowest pressure and purging the decompressed adsorber to desorb undesired impurities therefrom, and withdrawing residual product gas from another of said storage vessels having a higher pressure than the lowest pressure vessel and partially re-pressurizing the purged adsorber therewith.

4,021,211

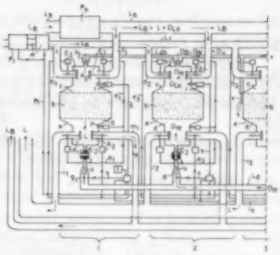
PROCESS AND APPARATUS FOR SEPARATION OF SOLVENTS FROM AN AIR STREAM LADEN WITH SOLVENT VAPORS

Klaus Turek, 5620 Velbert; Martin Schumacher, Bucheneck 10, 2819 Nordwohlde, and Richard Zimmermann, Schwachhauser Heerstr. 311, 28 Bremen, all of Germany

Filed Feb. 26, 1975, Ser. No. 553,100

Int. Cl.² B01D *53/04*

U.S. Cl. 55—18 **6 Claims**



1. A process for the separation of solvents from charged air stream laden with solvent vapours by adsorption by means of active carbon introduced into the air stream during a charging time interval followed by regeneration with desorption by means of a stream of steam during a regeneration time interval, using two or more active carbon chambers, which process includes the steps of automatically regulating the sequence of charging and regeneration time intervals in accordance with the concentration of the solvent vapours in said air stream,

subjecting the active carbon to desorption by steaming with a first volume of steam introduced into an active carbon chamber when switching over from charging to regeneration and then subjecting said active carbon to steaming with a second volume of steam that is less than said first volume when steam from said first volume breaks through on the outlet side of the active carbon chamber.

4,021,212

A/C FAN AND FILTER ASSEMBLY

William F. Legler, Sugar Grove, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 16, 1975, Ser. No. 623,194

Int. Cl.² B01D *46/24*

U.S. Cl. 55—470 **5 Claims**

1. A dual filter mounting system comprising:

first and second housing means, each having an annular portion defining a circular inlet opening;

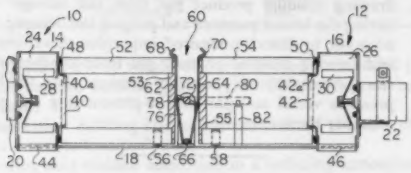
annular seat means surrounding the inlet opening of each of said housing means for receiving and supporting the end of an annular filter element;

said first and second housing means being spaced apart and

having said openings facing toward one another and coaxially aligned

a support member connecting said first and second housing means

clamping means disposed midway between said first and second housing means and connected to said support member;



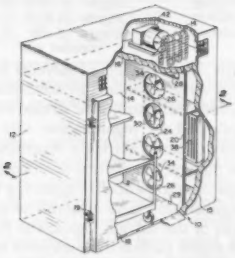
first and second annular elongated filter elements, each having an open end and a closed end, said filter elements coaxially disposed between said first and second housing means on opposite sides of said clamping means with said open end of each filter element in engagement with said annular seat of a separate one of said first and second housing means, and said clamping means engaging said closed ends of holding said filter elements in position between said first and second housing means.

4,021,213

FOOD STORAGE REFRIGERATION CABINET HAVING OPTIONAL FAST CHILL CYCLE

Graham B. Neidhardt, Oreland, and George Persak, Jr., Malvern, both of Pa., assignors to McGraw-Edison Company, Elgin, Ill.

Filed Aug. 25, 1975, Ser. No. 607,182
Int. Cl.² F25D *17/06*
U.S. Cl. 62—180 **5 Claims**



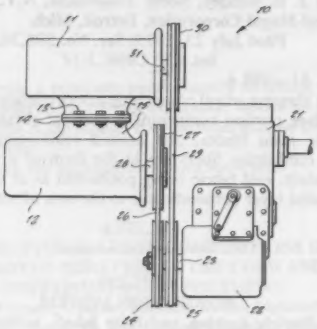
1. A refrigeration cabinet having an optional fast cool down cycle, the combination comprising partition structure in the cabinet separating a food storage enclosure from a plenum, refrigeration means including an evaporator coil located in the plenum, said partition structure having inlet and outlet opening means for ducting enclosure air to and over the evaporator coil and back to the enclosure, first fan means located between the inlet opening means and the evaporator coil and second fan means located between the evaporator coil and the outlet opening means, a control for operating the cabinet either on a conventional food storage cycle or on a fast cool down cycle, whereby the first fan means operates continuously on both cycles effective to move enclosure air through the inlet opening means and over the evaporator coil and from the outlet opening means back to the enclosure and the second fan means operates only on the cool down cycle effective to force the chilled air in the plenum downstream of the evaporator coil directly from the outlet opening means for greatly increased air turbulence within the enclosure, the control also including first means adapted with the cabinet operating on the storage cycle to cycle the refrigeration means on and off effective to maintain the enclosure air generally below a set temperature and second means adapted with the cabinet operating on the cool down cycle to bypass the first control means effective generally to operate the refrigeration means continuously, and the control also including third means to stop the fast cool down cycle and to shift back to the storage cycle.

4,021,214

TRANSMISSION POWERED AIR CONDITIONER COMPRESSORS

Willard Carl Bush, P.O. Box 28245, Dallas, Tex. 75228

Filed Apr. 11, 1975, Ser. No. 567,065
Int. Cl.² B60H *3/04*
U.S. Cl. 62—244 **3 Claims**



1. In a transmission powered air-conditioner compressors apparatus, the combination of a plurality of air-conditioner compressors, which are installed at a side of a transmission of an automotive truck, such apparatus including a power takeoff unit, between said transmission and said air-conditioner compressors, said power takeoff unit including an output drive shaft, having a pair of pulleys affixed thereupon, one of said pulleys having an endless belt therearound, which extends around a pulley affixed upon a shaft of a first of said air-conditioner compressors, another of said pulleys, of said power takeoff output drive shaft, having an endless belt therearound, extending around a pulley affixed upon a shaft of a second of said air-conditioner compressors, said compressors being supported from an eye beam secured by bolts to a beam secured to said transmission.

4,021,215

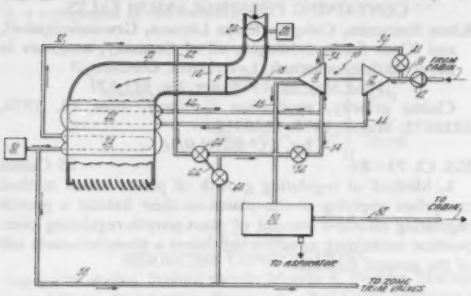
DUAL COMBINED CYCLE AIR-CONDITIONING SYSTEM

Fred M. Rosenbush, Newington, Conn., and Robert Telakowski, Fair Lawn, N.J., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 3, 1976, Ser. No. 682,414
Int. Cl.² F25D *9/00*
U.S. Cl. 62—402 **8 Claims**

1. In an aircraft air-conditioning system wherein outside air is used to cool bleed air which is sequentially fed to a compressor and a turbine and supplied to the aircraft cabin, the improvement which comprises means for separately feeding at

least a part of said bleed air directly to said turbine, means for varying the amount of flow of said bleed air to said compressor, and means for feeding used air from said cabin to said compressor.

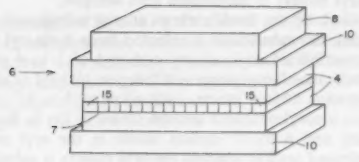


4,021,216

METHOD FOR MAKING STRIP MICROCHANNEL ELECTRON MULTIPLIER ARRAY

Adolf R. Asam, Daleville, and John T. Balkwill, Blue Ridge, both of Va., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Oct. 24, 1975, Ser. No. 625,432
Int. Cl.² C03B *37/00*
U.S. Cl. 65—4 B **10 Claims**



1. A method of forming a strip microchannel electron multiplier comprising the steps of:

providing a plurality of solid cladded glass fibers of uniform cross-section containing a core glass of etchable material and a cladding glass of nonetchable material;

heating said plurality of fibers in close proximity with each other to cause the fibers to adhere and form a block-like configuration;

heating a plurality of said fiber blocks in close proximity to each other to cause the blocks to adhere and form a linear array;

fusing a first strip of glass on one side of the linear array;

fusing a second strip of glass on the other side of the array to provide support to the array; and

heating the array at an annealing temperature to anneal the array.

4,021,217

DETECTING OPTICAL FIBER DEFECTS

Vladimir Edmund Bondybey, Fanwood; Louis Eugene Brus, Madison; Irene Dion Payne, Chatham, and Peter Michael Rentzepis, Millington, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

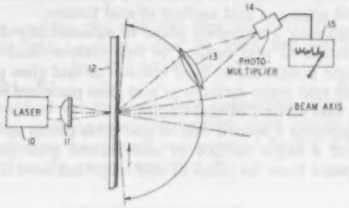
Filed July 8, 1975, Ser. No. 594,013
Int. Cl.² C03B *37/02*; G01N *21/16*
U.S. Cl. 65—13 **3 Claims**

1. A method for the manufacture of continuous lengths of optical fibers comprising the steps of:

drawing the fiber from a heated preform at a rate in excess of 10 meters per second,

directing a monochromatic light beam through the thickness of the drawn fiber approximately perpendicular to the axis of the fiber, the monochromatic light beam illuminating the entire width of the fiber,

detecting the light reflected or refracted from the fiber by placing at least one light detector outside both the plane containing the beam and the fiber and the plane containing the beam and perpendicular to the fiber, and at a position 5° to 70° off the latter plane thus signaling defects in the fiber, and



terminating the drawing of the fiber in response to light detected.

4,021,218

CHEMICAL METHOD OF STRENGTHENING GLASS ARTICLES SUBJECTED TO ABRASION RESISTANCE TREATMENT

Muneo Watanabe, Nishinomiya, Japan, assignor to Yamamura Glass Kabushiki Kaisha, Hyogo, Japan

Filed Nov. 13, 1975, Ser. No. 631,604
Claims priority, application Japan, Apr. 2, 1975, 50-39231
Int. Cl.² C03C *15/00*, *17/00*, *21/00*
U.S. Cl. 65—30 E **10 Claims**

1. A method of chemically strengthening a glass article which comprises (1) applying a metal oxide-forming compound selected from the group consisting of tin compounds, titanium compounds, zirconium compounds and vanadium compounds to the outer surface of a heated glass article to form a metal oxide coating having a thickness of 50 to 130 Angstroms on the outer surface of the glass article, (2) applying a concentrated mixed solution of potassium chloride and potassium nitrate having a potassium chloride to potassium nitrate weight ratio of 85 to 45 : 15 to 55, or a concentrated mixed solution of potassium sulfate and potassium nitrate having a potassium sulfate to potassium nitrate weight ratio of 30 to 100 : 70 to 0, to the outer and inner surfaces of the thus treated glass article having a temperature of 30° to 75° C, (3) maintaining the resultant glass article at an elevated temperature below the strain point of the glass but as near the strain point as possible for a period of time sufficient to obtain a compressive stress layer having a depth of at least 10 microns and a compressive stress of at least 700 kg/cm², (4) cooling the thus heated glass article to room temperature and removing the mixture of the potassium salts remaining on the outer and inner surfaces of the glass article.

4,021,219

METHOD OF MAKING A COMPOSITE GLASS STRUCTURE

George Fairbank Stockdale, Princeton, and John Leslie Cooper, Hightstown, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed July 12, 1976, Ser. No. 704,324
Int. Cl.² C03C *27/00*
U.S. Cl. 65—43 **14 Claims**

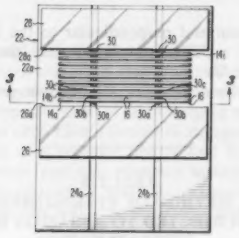
1. A method for assembling a structure which includes a plurality of spaced glass plates, each of said glass plates having a pair of opposing major surfaces and each having two pairs of opposing edge surfaces, which method comprises:

a. disposing one of said glass plates on a refractory fixture with an edge surface of said glass plate on a surface of

said fixture, said surface of said fixture being substantially planar and including at least two slots which extend along said surface, said edge of said glass plate extending transversely over said slots, said glass plate and said fixture being spatially oriented such that at least a component of gravity functions to enhance physical contact between said edge and said surface of said fixture;

b. disposing a reference plane in substantially orthogonal relation to said surface of said fixture, said reference plane positioned in fixed relation to said glass plate such that said major surfaces of said glass plate are orthogonal to said surface of said fixture;

c. disposing a second one of said glass plates as in step a) with a major surface of said second glass plate being spaced from the other of said major surfaces of said first



glass plate by at least a pair of refractory rigid cylindrical spacers, each of said spacers being axially disposed in parallel relation to the major surfaces of said first and second glass plates with one end of each of said spacers being slidably disposed in a separate slot and extending out of said slots so as to be in intimate contact with the other of said major surfaces of said first glass plate and said major surface of said second glass plate;

d. disposing a second reference plane in substantially orthogonal relation to said surface of said fixture, said second reference plane positioned in fixed relation to said second glass plate such that said major surfaces of said second plate are orthogonal to said surface of said fixture; and

e. bonding a surface of a glass base to the opposing edge surface of each of said glass plates.

4,021,220

FERTILIZER CONTAINING GROWTH ACTIVATORS FOR PLANTS

Jean-Claude Benois, Paris, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Dec. 8, 1975, Ser. No. 638,766

Claims priority, application France, Dec. 16, 1974, 74.41308

Int. Cl.² C05G *3/00*; A01N *9/24*

U.S. Cl. 71—27 **7 Claims**

1. Fertilizers containing the elements nitrogen, phosphorus and potassium, characterized in that they also contain 0.5 to 10% by weight of compounds of high molecular weight resulting from the polycondensation of naphthoquinone and maleic anhydride.

4,021,221

PLANT-GROWTH-REGULATING COMPOSITIONS CONTAINING PHOSPHOLANIUM SALTS

Klaus Naumann, Cologne; Klaus Lürssen, Grosskoenigsdorf, and Klaus Sasse, Schildgen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

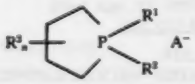
Filed May 28, 1975, Ser. No. 581,527

Claims priority, application Germany, June 14, 1974, 2428672; May 7, 1975, 2520315

Int. Cl.² A01N *9/36*

U.S. Cl. 71—86 **25 Claims**

1. Method of regulating growth of plants which method comprises applying to the plants or their habitat a growth regulating effective amount of plant-growth-regulating composition containing as active ingredient a phospholanium salt of the general formula:



(I),

in which

R^1 is alkyl of 1 to 4 carbon atoms, substituted alkyl substituted with at least 1 of hydroxyl, methoxy, methylcarbonyl, alkoxy carbonyl of 1 to 4 carbon atoms in the alkoxy group and halogen, alkenyl or alkynyl of up to 4 carbon atoms, or cycloalkyl of 3 to 12 carbon atoms, aralkyl of 1 to 4 carbon atoms in the alkyl moiety and 6 to 10 carbon atoms in the aryl moiety, or substituted aralkyl wherein the aryl moiety is substituted with halogen;

R^2 is alkyl of up to 4 carbon atoms, substituted alkyl wherein the substituent is selected from hydroxyl methoxy, methylcarbonyl, alkoxy carbonyl of 1 to 4 carbon atoms in the alkoxy group and halogen; alkenyl or alkynyl of up to 4 carbon atoms, cycloalkyl of 3 to 12 carbon atoms, aralkyl of 2 to 4 carbon atoms in the in the alkyl moiety and 6 to 10 carbon atoms in the aryl moiety, substituted aralkyl wherein the aryl moiety is substituted with halogen,

R^3 is halogen or alkyl of up to 4 carbon atoms,

n is 0, 1 or 2, and

A^- is one equivalent of an anion of a non-phytotoxic acid, in admixture with an agriculturally acceptable carrier.

4,021,222

THIOL CARBAMATES

Adolf Fischer, deceased, late of Mutterstadt, Germany (by Caecilia Emma Fischer, heiress-at-law); Hanspeter Hansen, Ludwigshafen, and Wolfgang Rohr, Mannheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Nov. 19, 1975, Ser. No. 633,446

Claims priority, application Germany, Dec. 6, 1974, 2457688

Int. Cl.² A01N *9/22*; C07D *205/04*

U.S. Cl. 71—88 **2 Claims**

1. S-(2,3-dichloroallyl)-(2,2,4-trimethylazetidine)-1-carbothiolate.

4,021,223

HERBICIDE

Adolf Fischer, Mutterstadt, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Division of Ser. No. 511,942, Oct. 3, 1974, Pat. No. 3,985,542. This application Sept. 8, 1975, Ser. No. 611,539

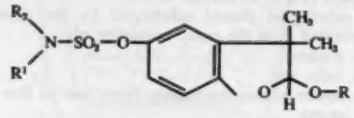
Claims priority, application Germany, Oct. 19, 1973, 2352537

Int. Cl.² A01N *9/00*

U.S. Cl. 71—88 **6 Claims**

1. A herbicide composition consisting essentially of an inert

carrier having dispersed therein a herbicidally effective amount of a mixture of
a. a compound of the formula

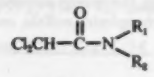


4,021,224
HERBICIDE COMPOSITIONS

Ferenc M. Pallos, Walnut Creek; Mervin E. Brokke, Moraga, and Duane R. Arneklev, Sunnyvale, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 208,041, Dec. 9, 1971, which is a continuation-in-part of Ser. No. 134,868, April 16, 1971, abandoned. This application Dec. 17, 1975, Ser. No. 641,783
Int. Cl.² A01N 9/02
U.S. Cl. 71—88 23 Claims

1. A herbicidal composition comprising an active thiocarbamate herbicide compound and a nonphytotoxic antidotally effective amount of a compound having the formula



wherein each of R_1 and R_2 are alkenyl groups containing from 2 to 12 carbon atoms, inclusive; said compound being antidotally active with said thiocarbamate herbicide compound and wherein said compound is present in an amount ranging between about 0.001 to 30 parts by weight for each part by weight of the active herbicidal compound.

4,021,225
COMBATING UNWANTED VEGETATION WITH 1,3,4-THIADIAZOLE-2-SULFONAMIDES

Loren W. Hedrich, Overland Park, and William C. Doyle, Jr., Leawood, both of Kans., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Feb. 26, 1971, Ser. No. 119,417
Int. Cl.² A01N 9/12
U.S. Cl. 71—90 1 Claim

1. The method of combating unwanted vegetation comprising applying to the locus of the unwanted vegetation an effective amount of 5-(1,3,3-trimethylureido)-N,N-dimethyl-1,3,4-thiadiazole-2-sulfonamide.

4,021,226
HERBICIDES

Helmut Preugschas; Ewald Daubach, both of Ludwigshafen; Roman Fischer, Mutterstadt, and Manfred Herrmann, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Oct. 8, 1975, Ser. No. 620,712
Claims priority, application Germany, Nov. 9, 1974, 2453255
Int. Cl.² A01N 9/22
U.S. Cl. 71—92 7 Claims

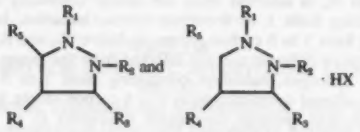
1. A herbicide composition comprising a stable, aqueous suspension of 10 to 65% by weight of 1-phenyl-4-amino-5-chloropyridazone-(6) or 1-phenyl-4-amino-5-bromopyridazone-(6), and, as the dispersant, a condensation product of a sulfonated phenol free from condensed ring systems, urea and formaldehyde, and which condensation product has been after-treated with a phenol and formaldehyde.

4,021,227
METHOD FOR CONTROLLING UNDESIRABLE PLANT SPECIES

Barrington Cross, Rocky Hill; Charles Paul Grasso, East Windsor, and Bryant Leonidas Walworth, Pennington, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 526,358, Nov. 22, 1974, Pat. No. 3,948,936. This application Oct. 20, 1975, Ser. No. 624,155
Int. Cl.² A01N 9/22, 9/36
U.S. Cl. 71—92 6 Claims

1. A method for the control of undesirable plant species comprising: applying to said undesirable plant species a herbicidally effective amount of a compound having a formula selected from the group consisting of:



wherein R_1 and R_2 each represent alkyl C_1–C_4; R_3 and R_5 each represent members selected from the group consisting of cycloalkyl C_3–C_7, benzyl, alkyl C_2–C_{12} and

Y and Z each represent members selected from the group consisting of hydrogen, halogen, alkyl C_1–C_4, alkoxy C_1–C_4, and carboxy; R_4 represents a member selected from the group consisting of hydrogen, alkyl C_1–C_{10}, provided when R_4 is hydrogen or methyl, at least one of R_3 and R_5 is a member other than phenyl; and HX represents an acid, and the rate of application of said compound to said undesirable plant is between 0.56 kg per hectare and 11.2 kgs per hectare.

4,021,228
SULFIDE HERBICIDE ANTIDOTE COMPOSITIONS AND METHOD OF USE

Duane R. Arneklev, Antelope, Mont., and Don R. Baker, Orinda, Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 394,230, Sept. 4, 1973, abandoned. This application June 27, 1975, Ser. No. 591,237
Int. Cl.² A01N 9/22
U.S. Cl. 71—96 4 Claims

1. The method of protecting a crop from injury due to a thicarbamate herbicide, comprising applying to the habitat prior to planting from about 0.01 to about 15 parts by weight for each part by weight of the thiocarbamate herbicide an antidote compound corresponding to the formula

$$R_1—S—R_2$$

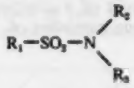
wherein R_1 is selected from the group consisting of phthalimidomethyl; and R_2 is selected from the group consisting of alkyl, having from 1 to 8 carbon atoms, inclusive.

4,021,229
SULFONAMIDE HERBICIDE ANTIDOTE COMPOSITIONS AND METHOD OF USE

Duane R. Arneklev, Antelope, Mont., and Don R. Baker, Orinda, Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Sept. 5, 1972, Ser. No. 285,971
Int. Cl.² A01N 9/12
U.S. Cl. 71—100 **13 Claims**

1. A herbicide composition comprising a mixture of a thiocarbamate herbicide and an antidotally effective amount of an antidote compound corresponding to the formula



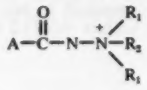
wherein R_1 is selected from the group consisting of alkyl containing from 1 to 6 carbon atoms, inclusive, haloalkyl having from 1 to 6 carbon atoms, inclusive; R_2 and R_3 can be the same or different and are selected from the group consisting of hydrogen, haloalkyl containing from 1 to 6 carbon atoms, alkenyl containing from 3 to 6 carbon atoms, inclusive wherein said antidote compound is present in an amount ranging between about D01 to about 15 parts by weight of the herbicide compound.

4,021,230
METHOD FOR PROTECTING PLANT LIFE FROM INJURY DUE TO FROST OR SUB-FREEZING TEMEPRATURES

Anson Richard Cooke, Hatfield; John Whitney Long, Chalfont, both of Pa., and Steven John Wiedman, Morton, Ill., assignors to Amchem Products, Inc., Ambler, Pa.

Filed Oct. 20, 1975, Ser. No. 623,883
Int. Cl.² A01N 9/20, 9/14
U.S. Cl. 71—111 **63 Claims**

1. A method of protecting a plant from injury from frost and sub-freezing temperatures, which comprises applying to the plant an effective, but non-phytotoxic amount, having regard to the plant being treated, of a compound of the formula:



wherein

R_1 is lower-alkyl containing from one to five carbon atoms;

R_2 is selected from the group consisting of:

a. lower-alkyl containing from one to five carbon atoms, and

b. 2-hydroxy alkyl of 3 to 18 carbon atoms; and

A is selected from the group consisting of:

a. alkyl of 3 to 13 carbon atoms,

b. 2-hydroxy-lower alkyl containing from one to five carbon atoms,

c. lower alkenyl containing from three to five carbon atoms and one double bond,

d. substituted phenyl,

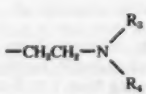
substituted by substituents selected from the group consisting of:

i. p-nitro,

ii. halo, and

iii. lower alkoxy containing from one to five carbon atoms,

(e)



wherein

R_3 and R_4 are each independently selected from the group consisting of:

i. hydrogen,

ii. alkyl of 2 to 18 carbon atoms,

iii. substituted phenyl substituted by the substituents selected from the group consisting of:

a. p-nitro,

b. halo, and

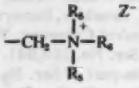
c. lower alkoxy containing from one to five carbon atoms,

iv. benzyl,

v. lower-alkoxy carbonyl, and

vi. 2-hydroxy-lower alkyl containing from one to five carbon atoms, and

(f)



wherein

R_5 is lower alkyl;

R_6 is selected from the group consisting of:

i. alkyl of 3 to 8 carbon atoms,

ii. 2-hydroxy lower alkyl containing from one to five carbon atoms, and

Z^- is selected from the group consisting of halide, nitrite, nitrate, diacid phosphate, sulfate and alkylsulfate.

4,021,231
METHOD FOR REDUCTION OF SUCROSE LOSS DURING STORAGE OR SUGAR BEETS DUE TO REDUCTION IN RESPIRATION AND INVERT SUGAR FORMATION

Arthur H. Freytag, and Walter R. Akeson, both of Longmont, Colo., assignors to The Great Western Sugar Company, Denver, Colo.

Filed May 14, 1974, Ser. No. 469,657
Int. Cl.² A01N 9/00
U.S. Cl. 71—127 **2 Claims**

1. A method for reduction of sucrose loss during storage of sugar beets due to respiration and invert sugar formation which comprises injecting ethylene gas into the soil between and near the middle of rows of growing sugar beets at spaced intervals in amounts sufficient to reduce respiration and inhibit invert sugar formation in the harvested beets, at a depth of from 6 to 8 inches beneath the soil when the beets have reached the fifth leaf stage.

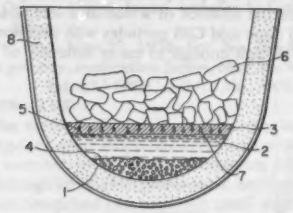
4,021,232
CAST IRON MELTING PROCESS

Michio Makino; Takashi Kawai, both of Kitakyushu; Ryoji Takahashi, Yukuhashi; Yoshimi Kubo, and Fumio Obata, both of Kitakyushu, all of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed July 29, 1975, Ser. No. 600,117
Claims priority, application Japan, Aug. 9, 1974, 49-90997; Apr. 30, 1975, 50-51396; Apr. 30, 1974, 49-51397
Int. Cl.² C21C 5/52
U.S. Cl. 75—12 **37 Claims**

1. A cast iron melting process for producing a primary melt for spheroidal graphite cast iron in an arc furnace having a bottom portion for containing iron melt therein and an electric arc-producing means, comprising the steps of: charging granular recarburizer for providing carbon to the iron melt into the bottom portion of the arc furnace to form a layer of recarburizer thereon; and charging irons scraps and a material adapted to form an oxidative slag onto the layer of recarburizer; and actuating the arc-producing means to supply heat to the furnace and to form an iron melt above said layer of recarburizer with a layer of oxidative slag thereon, whereby a

recarburizing reaction of said recarburizer with the iron melt is carried out simultaneously with an oxidizing reaction of said



iron melt with said oxidative slag at a low temperature range in the course of melting of said iron scraps and the heating of the iron melt.

4,021,233

METALLURGICAL PROCESS

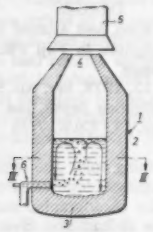
Mans Klas Olof Johnsson, and Lars Anders Eriksson, both of Hagfors, Sweden, assignors to Uddeholms Aktiebolag, Uddeholms, Sweden

Division of Ser. No. 295,355, Oct. 5, 1972, Pat. No. 3,867,135. This application Feb. 18, 1975, Ser. No. 550,554

Claims priority, application United Kingdom, Oct. 6, 1971, 46507/71; Feb. 28, 1972, 9162/72; Sweden, June 9, 1972, 7583/72

Int. Cl.² C21C *5/34*

U.S. Cl. 75—60 **12 Claims**



1. A method of reducing the carbon content of a carbon-containing alloy, said alloy containing at least 10% by weight of chromium and, as the major component thereof, at last one metal selected from the group consisting of iron, cobalt and nickel, said method comprising:

a. first melting the alloy and bringing the molten alloy substantially up to the decarburization temperature essentially by oxidising substantially completely any silicon present in the alloy and also, if necessary, at least part of any other readily oxidisable component present in the alloy,

b. thereafter, decarburizing the alloy at a decarburization temperature of about 1550° to about 1800° C by introducing a gas consisting essentially of oxygen or a gas consisting essentially of a mixture of oxygen together with at least one hydrogen containing compound selected from the group consisting of steam and ammonia through the inner most tube of a tuyere containing at least two co-axial tubes and by introducing a gas consisting essentially of at least one hydrogen containing compound selected from the group consisting of steam and ammonia through a tube other than the inner most of said tuyere, said tuyere opening into the molten alloy at at least about 20 centimeters below the surface thereof, said oxygen oxidising carbon in the alloy to carbon monoxide, the volume ratio of the introduced oxygen to the hydrogen containing compound during at least part of the main decarburization period being below 3:1, said hydrogen containing compound liberating elementary hydrogen in the molten alloy, the amount of hydrogen and carbon monoxide in the molten alloy being such that the partial pressure of carbon monoxide in the molten alloy is below 0.5 atmospheres and lower than that partial pressure which corresponds to the equilibrium pressure for the carbon/chromium oxidation,

c. maintaining the molten alloy at a decarburization temperature of at least about 1500° C essentially by oxidizing chromium in the alloy, wherein the decarburization temperature is at least partly controlled by varying the volume ratio of introduced oxygen to hydrogen-containing compound, said ratio being decreased during the course of the decarburization to below 1:1, using amounts and concentrations such that the decarburization temperature is essentially maintained at no greater than about 1800° C and,

d. thereafter removing at least part of the hydrogen remaining in the molten alloy.

4,021,234

METHOD FOR REMOVING IMPURITIES IN LIQUID METAL

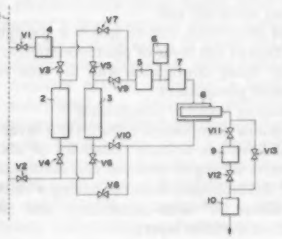
Hiromichi Nei, Yokohama, and Koh Hashiguchi, Oarai, both of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Nov. 6, 1975, Ser. No. 629,814

Claims priority, application Japan, Nov. 14, 1974, 49-130433

Int. Cl.² C22B *26/10;* **C01B** *6/04*

U.S. Cl. 75—66 **12 Claims**



1. A method for removing hydrogen and other impurities contained in liquid metal comprising cooling the liquid metal containing hydrogen and other impurities below their saturation temperature to precipitate hydrogen and other impurities in the form of various compounds of the metal, trapping and accumulating the precipitate, dissolving the thus accumulated precipitate in a small amount of liquid metal having a temperature at least above said saturation temperature to produce a high temperature liquid metal having a high hydrogen concentration, contacting the high temperature liquid metal with one side of a metal membrane having hydrogen permeability, the other side of said metal membrane being at reduced pressure, thereby selectively removing hydrogen in a gaseous state from the liquid metal.

4,021,235

OPERATING METHOD FOR SLAG CLEANING FURNACE IN COPPER REFINING

Toshihiro Yuki, Saganoseki, Japan, assignor to Nihon Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 28, 1975, Ser. No. 625,803

Claims priority, application Japan, Oct. 28, 1974, 49-123324

Int. Cl.² C22B *15/00;* **C21B** *3/04*

U.S. Cl. 75—72 **11 Claims**

1. In a process for recovering copper from slag discharged

from a copper smelting furnace, wherein the slag is heated in a slag cleaning furnace to enhance copper recovery, the improvement comprising adding to the slag in the slag cleaning furnace zinc removed tailings previously produced by removing zinc from the residue discharged from a zinc refining process.

4,021,236
IMAGING SYSTEM

Nicholas K. Sheridon, Saratoga, Calif., and Dorian Kermisch, Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1975, Ser. No. 571,199
Int. Cl.² G03G 5/028
U.S. Cl. 96—1.5 **31 Claims**

1. An imaging system comprising an imaging member having a flexible conductive metallic layer arranged between a layer of a thermoplastic material having a volume resistivity above about 10^4 ohm-cm and a layer of elastomer material having a volume resistivity above about 10^4 ohm-cm; means for establishing an imagewise electrical field across one of said thermoplastic layer or said elastomer layer; and means for softening said thermoplastic layer.

26. An imaging member comprising

a. a deformable component having (i) a flexible conductive metallic layer arranged between and contiguous with (ii) a layer of thermoplastic material having a volume resistivity above about 10^4 ohm-centimeters and (iii) a layer of elastomer material having a volume resistivity above about 10^4 ohm-centimeters;

b. a layer of photoconductive material contiguous with either the layer of thermoplastic material or the layer of elastomer material; and

c. a pair of electrodes, one of which is contiguous with the free surface of the layer of photoconductive material and the other being contiguous with the free surface of the deformable component.

31. An imaging member comprising

a. a deformable component having (i) a layer of elastomer material having a volume resistivity of about 10^4 ohm-centimeters arranged between and contiguous with (ii) a layer of thermoplastic material having a volume resistivity above about 10^4 ohm-centimeters and (iii) a flexible conductive metallic layer;

b. a layer of photoconductive material contiguous with the surface of the layer of thermoplastic material;

c. an electrode contiguous with the free surface of the layer of photoconductive material; and

d. a cavity which is defined in part by the free surface of the layer of elastomer material, said cavity containing an ionizable gas or material which is capable of producing a conductive gaseous plasma.

4,021,237
PROCESS FOR PRODUCING CADMIUM SULFIDE FOR ELECTROPHOTOGRAPHY

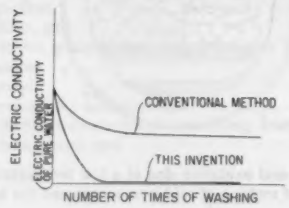
Hirokuni Kawashima, Tokyo, and Kiyoshi Suzuki, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,895
Int. Cl.² G03G 5/04
U.S. Cl. 96—1.5 **36 Claims**

1. A process for producing donor and acceptor impurity-doped CdS having a fine particle size and useful in electrophotography wherein the amount of doped impurities in the CdS can be quantitatively controlled and wherein the particle size can be controlled, said process comprising the steps of:

1. contacting sulfide ion with cadmium ion and a measured amount of a donor impurity element selected from the group consisting of elements of Groups IIIa and IIIb of the Periodic Table in an aqueous 1N to 4N sulphuric acid solution to suppress formation of coarse CdS particles and form fine CdS particles containing said donor impurity;

2. firing the resulting CdS particles containing said donor impurity in the absence of a flux at a temperature high enough to dope said CdS particles with said donor impurity but not high enough to cause sintering of said CdS



particles to control the CdS particle size by suppressing formation of large CdS particles; and

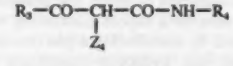
3. adding a measured amount of an acceptor impurity during either step (1) or step (2), wherein said firing dopes with CdS with a quantitatively-controlled amount of said donor and acceptor impurities.

4,021,238
PROCESS OF FORMING COLOR PHOTOGRAPHIC IMAGES

Jun Hayashi; Takeshi Kato, and Atsuaki Arai, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jan. 22, 1975, Ser. No. 543,091
Claims priority, application Japan, Jan. 22, 1974, 49-9566
Int. Cl.² G03C 7/16
U.S. Cl. 96—22 **12 Claims**

1. A process for forming color photographic images which comprises color developing at temperatures higher than about 30° C a multilayer color photographic material comprising a support having thereon at least two silver halide photosensitive emulsion layers each containing a coupler which can form a non-diffusible colored dye on coupling with the oxidation product of an aromatic primary amino color developing agent and, located either between said silver halide photosensitive emulsion layers or closer to the support than said layers, at least one fogged emulsion layer containing a coupler which can form a non-diffusible colored dye on coupling with the oxidation product of an aromatic primary amino color developing agent, said fogged emulsion layer containing either a water-soluble metal salt and physical development nuclei or an optically or chemically fogged silver halide, wherein at least one of said silver halide photosensitive layers is a blue-sensitive layer and contains an alpha mono-substituted acylamide yellow coupler represented by general formula (V);



$$R_3-CO-\underset{\displaystyle Z_4}{\underset{|}{CH}}-CO-NH-R_4 \qquad (V)$$

wherein R_3 represents a primary alkyl group having 1 to 18 carbon atoms, a secondary alkyl group, a tertiary alkyl group, an aryl group; R_4 represents an aryl group; and Z_4 represents a halogen atom, an acyloxy group, an aryloxy group, a heterocyclic aromatic carbonyloxy group, a sulfimido group, an alkylsulfoxy group, an arylsulfoxy group, a phthalimido group, a dioxoimidazolidinyl group, a dioxothiazolidinyl group, an indazolyl group, or a dioxothiazolidinyl group.

4,021,239

METHOD OF EXPOSING PARALLEL STRIPE-LIKE AREAS ON PHOTOSENSITIVE MEMBER

Kazuaki Ogawa, Atsugi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 17, 1976, Ser. No. 686,804
Claims priority, application Japan, May 20, 1975, 50-60004
Int. Cl.² G03C 5/04, 5/00, 5/06
U.S. Cl. 96—27 E 7 Claims

1. In the method of exposing a relatively large number of parallel, spaced apart stripe-like areas on a surface of a photosensitive member by the steps of directing light against said surface through an original photo-mask having a light-permeable pattern comprised of a relatively small number of parallel, spaced apart, stripe-like light-permeable areas of lengths substantially smaller than the lengths of said stripe-like areas to be exposed on said surface of the photo-sensitive member, effecting repeated relative movements of said photo-sensitive member and original photo-mask in a direction parallel to said stripe-like light-permeable areas so that light passing through the latter will scan said surface of the photo-sensitive member along the full length of said stripe-like areas to be exposed thereon, and relatively shifting said photo-sensitive member and said original photo-mask in the direction transverse to said direction of said relative movements thereof for each of said repeated relative movements so that, upon the completion of the latter, light passing through said light-permeable pattern of the original photo-mask will have scanned said relatively large number of stripe-like areas on said surface of the photo-sensitive member: the improvement comprising forming said stripe-like, light-permeable areas of the original photo-mask with respective lengths that decrease progressively from maximum values adjacent the center of said light-permeable pattern, considered in said direction of the relative shifting, to minimum values at the opposite sides of said pattern, also considered in said direction of the relative shifting; and effecting each said relative shifting through a predetermined distance which is substantially less than the width of said pattern in said direction of the relative shifting so that each said stripe-like area on said surface of the photo-sensitive member is exposed to a substantially uniform amount of light along the length thereof.

4,021,240

PHOTOTHERMOGRAPHIC AND THERMOGRAPHIC COMPOSITIONS AND USES THEREFOR CONTAINING SULFONAMIDOPHENOL REDUCING AGENTS AND FOUR EQUIVALENT COLOR COUPLERS

Felice Mary Cerquone, Denver, Colo.; Rolf Steven Gabrielsen, and Roland George Willis, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,928
Int. Cl.² G03C 5/54, 1/40, 7/00, 1/02
U.S. Cl. 96—29 D 33 Claims

14. A diffusion transfer, photothermographic element for producing a developed, color image comprising, in sequence, a support having coated thereon (A) a layer I comprising

a. photographic silver halide in association with

b. an oxidation-reduction image-forming combination comprising

i. a non light sensitive organic silver salt oxidizing agent with

ii. a reducing agent which is a 2,6-dichloro or 2,6-dibromo-4-substituted sulfonamidophenol,

c. a four equivalent, color-forming coupler, and

d. a polymeric binder, and (B) an image receiving layer II capable of receiving a dye from said layer I.

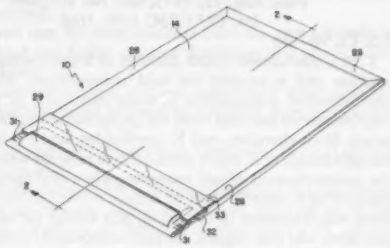
32. A process of providing a dye image in an exposed, diffusion transfer, photothermographic element as described in claim 14 comprising heating said exposed element to a temperature of about 80° C. to about 250° C. and providing a solvent to aid in the transfer of dye from said layer I to said image receiving layer II.

4,021,241

DIFFUSION TRANSFER PROCESSING SOLUTIONS WITH CARBOXYMETHYL HYDROXYETHYL CELLULOSE

Richard W. Young, Wellesley Hills, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 460,599, April 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 272,412, July 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 148,590, June 1, 1971, abandoned. This application Mar. 10, 1976, Ser. No. 665,518
Int. Cl.² G03C 7/00, 5/54, 1/48, 1/40
U.S. Cl. 96—29 D 11 Claims



10. A process for providing a photographic diffusion transfer dye image which comprises, in combination, the steps of:

a. exposing to incident electromagnetic radiation a composite photographic film unit which comprises a plurality of sequential layers including a first dimensionally stable layer; a photosensitive silver halide layer having associated therewith dye developer which is processing composition soluble and diffusible at a first pH as a function of the point-to-point degree of silver halide layer exposure to incident actinic radiation; a layer adapted to receive solubilized dye developer diffusing thereto; a second dimensionally stable layer transparent to radiation actinic to the silver halide layer; a rupturable container retaining an alkaline processing composition possessing said first pH at which said dye developer is soluble and diffusible and 0.1–10%, by weight, of a viscosity increasing polymer comprising carboxymethyl hydroxyethyl cellulose and titanium dioxide pigment in a ratio of 1 to 10 grams of titanium dioxide per 0.1 grams of polymer, said rupturable container positioned and extending transverse an edge of the photosensitive element to effect unidirectional discharge of the container's processing composition intermediate the layer adapted to receive the dye developer and the silver halide emulsion layer next adjacent thereto;

b. effecting discharge of the contents of said rupturable container intermediate said layer adapted to receive the dye developer and the next adjacent silver halide layer; forming thereby a layer of viscosity increasing polymer and titanium dioxide therebetween;

c. effecting thereby development of said silver halide layers; and

d. forming thereby an imagewise distribution of mobile dye developer which is transferred, at least in part, by diffusion image-forming material;

e. transferring, by diffusion, at least a portion of the imagewise distribution of mobile dye image-forming material to the layer adapted to receive dye developer diffusing thereto provide a dye image in terms of the imagewise distribution; and

f. subsequent to substantial transfer of mobile dye developer to the layer adapted to receiving dye developer diffusing thereto, effecting reduction of the pH of the film unit by means of acid disposed within said film unit to thereby convert the pH of the film unit from the first pH to a

second pH at which the dye developer is substantially nondiffusible and

g. maintaining the film unit intact subsequent to processing.

4,021,242

NEGATIVE WORKING PHOTORESIST MATERIAL COMPRISING A N-VINYL MONOMER, AN ORGANIC HALOGEN COMPOUND PHOTOACTIVATOR AND A MALEIC ANHYDRIDE MODIFIED ROSIN AND THE USE THEREOF

Raymond W. Newyear, Willoughby, and James M. Lewis, Aurora, both of Ohio, assignors to Horizons Incorporated, Cleveland, Ohio

Filed Aug. 15, 1975, Ser. No. 605,009

Int. Cl.² G03C *5/00, 1/68*

U.S. Cl. 96—36 **18 Claims**

1. In a photoresist which consists of a photosensitive composition and a support for said composition, wherein the photosensitive composition consists essentially of (1) an N-vinyl monomer selected from the group consisting of N-vinylamines, N-vinylamides, and N-vinylimides, and (2) an organic halogen compound which splits off free radicals which assist in the polymerization of said monomer when said composition is exposed to a suitable dose of actinic radiation, the improvement which consists in providing as a binder for said N-vinyl monomer and said organic halogen compound, a maleic anhydride modified rosin having an acid number between 80 and 135 and which is soluble in alcohol.

4,021,243

DIAZO LIGHT-SENSITIVE COPYING COMPOSITION AND PROCESS OF USING IN THE MANUFACTURE OF SCREEN PRINTING STENCILS

Hartmut Steppan, Wiesbaden-Dotzheim, and Hans Ruckert, Wiesbaden-Schierstein, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Continuation of Ser. No. 172,886, Aug. 18, 1971, abandoned. This application Jan. 22, 1976, Ser. No. 651,317

Claims priority, application Germany, Aug. 20, 1970, 2041395

Int. Cl.² G03F *7/12, 7/08*

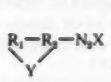
U.S. Cl. 96—36.4 **27 Claims**

1. A process for the preparation of screen printing stencils, which comprises coating a screen printing support with a liquid light-sensitive composition comprising a hydrophilic hardenable binder in admixture with a condensation product comprising repeating units of each of the general types

$$A—N_2X \text{ and } B$$

which are linked by methylene groups, in which
A is a radical of a compound of one of the general formulae

$$(R_1—R_3—)_p R_2—N_2X \text{ and}$$



wherein
R_1 is an arylene group of the benzene or naphthalene series
R_2 is a phenylene group
R_3 is a single bond or one of the groups

$$—(CH_2)_q—NR_4—$$

$$—O—(CH_2)_r—NR_4—$$

$$—S—(CH_2)_r—NR_4—$$

$$—S—CH_2—CO—NR_4—$$

$$—O—R_5—O—$$

$$—O—$$

$$—S— \text{ or}$$

$$—CO—NR_4—$$

the left-hand free valence of the specified groups is attached to R_1 and the right-hand free valence is attached to R_2
wherein
q is a number from 0 to 5
r is a number from 2 to 5
R_4 is selected from the group consisting of hydrogen, alkyl with 1 to 5 carbon atoms, aralkyl with 7 to 12 carbon atoms, and aryl with 6 to 12 carbon atoms,
R_5 is an arylene group having 6 to 12 carbon atoms
—Y— is one of the groups

$$—NH—, \text{ and } —O—$$

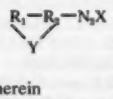
X is the anion of an aliphatic monosulfonic acid having 1 to 6 carbon atoms, and
p is a number from 1 to 3, and
B is a radical of a compound free of diazonium groups selected from the group consisting of aromatic amines, phenols, thiophenols, phenol ethers, aromatic thioethers, aromatic heterocyclic compounds, aromatic hydrocarbons and organic acid amides,
which condensation product contains, on the average, about 0.01 to 50 B units per unit of $A—N_2X$,
drying the light sensitive layer thus prepared,
exposing the dried layer to light under a master, and removing the unexposed portions of the layer by treatment with an aqueous liquid.

15. A light-sensitive reproduction material including a screen printing support carrying a light-sensitive layer comprising a hydrophilic hardenable binder in admixture with a light-sensitive condensation product comprising repeating units of each of the general types

$$A—N_2X \text{ and } B$$

which are linked by methylene groups, in which
A is a radical of a compound of one of the general formulae

$$(R_1—R_3—)_p R_2—N_2X \text{ and}$$



wherein
R_1 is an arylene group of the benzene or naphthalene series
R_2 is a phenylene group
R_3 is a single bond or one of the groups

$$—(CH_2)_q—NR_4—$$

$$—O—(CH_2)_r—NR_4—$$

$$—S—(CH_2)_r—NR_4—$$

$$—O—R_5—O—$$

$$—O—$$

$$—S— \text{ or}$$

$$—CO—NR_4—$$

the left-hand free valence of the specified groups is attached to R_1 and the right hand free valence is attached to R_2
wherein
q is a number from 0 to 5
r is a number from 2 to 5
R_4 is selected from the group consisting of hydrogen, alkyl

with 1 to 5 carbon atoms, aralkyl with 7 to 12 carbon atoms, and aryl with 6 to 12 carbon atoms,

R_5 is an arylene group having 6 to 12 carbon atoms

—Y— is one of the groups

—NH—, and —O—

X is the anion of an aliphatic monosulfonic acid having 1 to 6 carbon atoms, and

p is a number from 1 to 3, and

B is a radical of a compound free of diazonium groups selected from the group consisting of aromatic amines, phenols, thiophenols, phenol ethers, aromatic thioethers, aromatic heterocyclic compounds, aromatic hydrocarbons and organic acid amides,

which condensation product contains, on the average, about 0.01 to 50 B units per unit of $A—N_2X$.

4,021,244

SILVER HALIDE PHOTOGRAPHIC MATERIALS WITH SURFACE LAYERS COMPRISING BOTH ALKALI AND ACID PRODUCED GELATIN

Shigeru Nagatomo, and Kiyotaka Hori, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 17, 1975, Ser. No. 569,115

Claims priority, application Japan, Apr. 17, 1974, 49-42860

Int. Cl.² G03C *1/76, 3/00, 1/02*

U.S. Cl. 96—67 **14 Claims**

1. A silver halide photographic sensitive material comprising a support and at least one light-sensitive silver halide emulsion layer and with a surface layer located on the same side of the support as the light-sensitive silver halide emulsion layers and containing gelatin produced by processing collagen in acid and gelatin produced by processing collagen in alkali, in a ratio by weight of the gelatin produced by processing collagen in alkali to the gelatin produced by processing collagen in acid of about 0.5% or more but less than 100%, the total of the gelatin produced by processing collagen in acid and the gelatin produced by processing collagen in alkali in said surface layer being greater than about 20% by weight of the total weight of the binder in the surface layer, said surface layer not being a light-sensitive layer.

4,021,245

PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Shigeru Nagatomo, and Kiyotaka Hori, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 30, 1975, Ser. No. 573,239

Claims priority, application Japan, Apr. 30, 1974, 49-48572

Int. Cl.² G03C *1/76*

U.S. Cl. 96—67 **13 Claims**

1. A photographic light-sensitive material comprising a support, a silver halide emulsion layer, and an uppermost layer thereon; said uppermost layer consisting essentially of a binder and a colloidal dispersion of silicic acid anhydride; said binder including a gelatin derivative in an amount of at least about 20% by weight based on the total weight of the binder in said uppermost layer; said silicic acid anhydride having a grain size of 1 nm to 150 nm; and said colloidal dispersion of silicic acid anhydride being employed in an amount of about 0.05 to 2.0 grams per gram of the total amount of binder in said uppermost layer.

4,021,246

FREE RADICAL PHOTOSENSITIVE COMPOSITIONS CONTAINING BIS-SULFIDES OR SULFINYL ESTERS AS ANTIFOGGANTS

Paul L. Bachman, Cleveland Heights, Ohio, and John S. Adams, Jr., deceased, late of Chesterland, Ohio (by Dora E. Adams, administratrix), assignors to Horizons Incorporated, a division of Horizons Research Incorporated, Cleveland, Ohio

Filed Dec. 15, 1975, Ser. No. 641,031

Int. Cl.² G03C *1/52*

U.S. Cl. 96—67 **9 Claims**

1. In a photosensitive composition consisting essentially of:

1. at least one leuco diaryl or triaryl methane dye forming compound;

2. at least one dye base selected from the group consisting of styryl dye bases, cyanine dye bases and merocyanine dye bases;

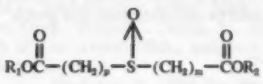
3. at least one organic halogen compound which provides free radicals when exposed to a suitable does of radiation; and

a film forming polymer in which constitutes (1), (2) and (3) are supported;

the improvement which comprises including in said composition an organic sulfur compound selected from the group consisting of bis-sulfides represented by the formula

$$CH_3(CH_2)_{x'}S(CH_2)_nS(CH_2)_{x'}\ CH_3$$

wherein *n* is an integer from 1 to 10 and each of *x* and *x'* is an integer from 0 to 20 and sulfinyl esters represented by the formula



in which *p* and *m* are each integers from 2 to9 and R_1 and R_2 are each selected from the group consisting of alkyl and alkenyl groups with up to 20 carbon atoms, said organic sulfur compound being present in said composition in an amount which is effective to provide improved resistance to dark fogging.

4,021,247

METHOD OF DISPERSING ORGANIC COMPOUNDS USEFUL IN PHOTOGRAPHY

Masanao Hinata, and Yuji Mihara, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

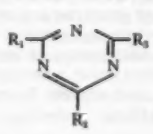
Filed Nov. 13, 1974, Ser. No. 523,650

Claims priority, application Japan, Nov. 13, 1973, 48-127521

Int. Cl.² E03C *1/02, 1/28*

U.S. Cl. 96—94 R **4 Claims**

1. A method for dispersing a compound represented by the formula



wherein R_1, R_2 and R_3 each represents a hydrogen atom, a hydroxyl group, an alkoxy group, an aryl group, an aryloxy group, a halogen atom, a heterocyclic group, an alkylthio group, an arylthio group, a heterocyclic thio group, an amino group, an alkylamino group, an arylamino group, or a heterocyclic amino group in a silver halide photographic emulsion

which comprises (i) preparing a silver halide photographic emulsion, (ii) dissolving said compound in a water-soluble, water-miscible acid selected from the group consisting of methane sulfonic acid and ethane sulfonic acid, said acid containing less than 10% water, (iii) dispersing said solution (ii) in an aqueous solution and then adding said dispersion to said silver halide photographic emulsion, or (iv) adding said solution (ii) directly to said silver halide photographic emulsion.

4,021,248
COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Keisuke Shiba; Kiyoshi Nakazyo; Reiichi Ohi, and Keiichi Adachi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

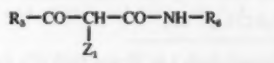
Filed Sept. 3, 1975, Ser. No. 610,014

Claims priority, application Japan, Sept. 3, 1974, 49-101678

Int. Cl.² G03C *1/40, 7/00*

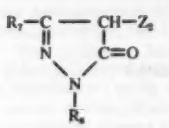
U.S. Cl. 96—100 **40 Claims**

1. A color photographic light-sensitive material comprising a silver halide photographic emulsion containing (1) at least one compound selected from the group consisting of (a) a compound represented by the following formulae (III), (IVa) or (IVb);

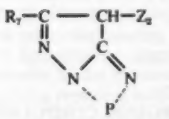


(III)

wherein R_5 represents a primary, secondary or tertiary substituted or unsubstituted alkyl group having one to eighteen carbon atoms or a substituted ur unsubstituted aryl group, and R_6 represents a substituted or unsubstituted aryl group;



(IVa)



(IVb)

wherein R represents the atoms necessary to complete a heterocyclic ring, R_7 and R_8 each represents one of the same groups as defined for R_5 or is an alkoxy group having 1 to 18 carbon atoms, a heterocyclic ring, an alkoxy carbonyl group, and aryloxycarbonyl group, an aralkylthio group, an arylthio group, a carboxy group, an acylamino group, a diacylamino group and N-alkylacylamino group, an N-arylacylamino group, a ureido group, a thioureido group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, an alkoxythiocarbonylamino group, an aryloxythiocarbonylamino group, an anilino group, an alkylamino group, a cycloamino group, an alkylcarbonyl group, an arylcarbonyl group, a sulfonamido group, a carboamoyl group, a sulfamoyl group, a guanidino group, a cyano group, an acyloxy group, a sulfonyloxy group, a hydroxy group, a mercapto group, a halogen atom, or sulfo group, and wherein Z_1 and Z_2 represent the formulae (Ia), (Ib) or (Ic):

$-NHR_1$	(Ia)
$-NR_2R_3$	(Ib)
$-N=N-R_4$	(Ic)

wherein R_1 represents an acyl group, a halogenated alkyl group having up to three carbon atoms or a halogenated phenyl group, R_2 and R_3, which may be the same or different, each represents one of the same groups as R_1 or can be combined together with the nitrogen atom of the coupling-off group to form a heterocyclic residue, R_4 represents one of the same groups as defined for R_1 or represents an unsubstituted or substituted aryl group, and (b) a 4-position unsubstituted 3-arylamino-5-pyrazolone derivative, and (2) at least one compound represented by the following general formula (II);

Q—SH (II)

wherein Q represents a 5-or 6-membered ring containing at least one of N, O, S or Se as a hetero atoma with the —SH moiety attached to a carbon atom of the ring and having directly or indirectly bonded thereto at least one of a $—SO_3H$ group, a —COOH group, an —OH group and a —NHR group, where R represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms.

4,021,249
HEAT DEVELOPABLE LIGHT-SENSITIVE MATERIAL INCORPORATING A SUBSTITUTED s-TRIAZINE-2,4,6-(1H, 3H, 5H)-TRIONE REDUCING AGENT

Yasuhiro Noguchi, Tokyo; Toshinao Ukai, Asaka; Kenji Sashihara, Asaka, and Takao Masuda, Asaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 12, 1975, Ser. No. 612,984

Claims priority, application Japan, Sept. 12, 1974, 49-105290

Int. Cl.² G03C *1/02, 1/48, 1/06*

U.S. Cl. 96—114.1 **11 Claims**

1. A heat devlopable light-sensitive material comprising a support having therein or in one or more layers thereon (a) an organic silver salt, (b) a light-sensitive silver halide or a component capable of forming a light-sensitive silver halide by reaction with the organic silver salt, and (c) as a reducing agent an s-triazine-2,4,6-(1H, 3H, 5H)-trione substituted with a phenol derivative having a substituted group in at least one ortho-position thereof with respect to the hydroxyl group thereof) in at least one of the 1-, 3- or 5-positions.

4,021,250
THERMALLY DEVELOPABLE PHOTOSENSITIVE MATERIAL

Kenji Sashihara; Takao Masuda; Hiroshi Yamashita, and Yasuhiro Noguchi, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

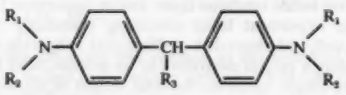
Filed Oct. 1, 1974, Ser. No. 510,970

Claims priority, application Japan, Oct. 1, 1973, 48-110287

Int. Cl.² G03C *1/02, 1/06, 1/34*

U.S. Cl. 96—114.1 **10 Claims**

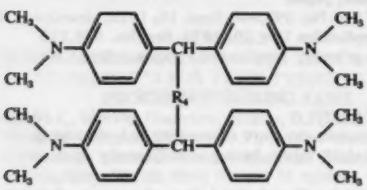
1. A thermally developable photosensitive material comprising a support having thereon in one or more layers, (a) an organic silver salt, (b) a catalytic amount of a photosensitive silver halide or a compound capable of forming photosensitive silver halide, (c) a reducing agent, (d) a binder and (e) at least one compound represented by the following general formula (I),



(I)

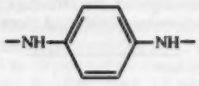
wherein R_1 and R_2 each is an alkyl group or an aralkyl group; and R_3 is a hydrogen atom, an alkyl group, a chloroanilino group, a benzyloxy group, a 2-oxo-1-(N-phenylcarbamoyl)-propyl group, a phenyl group, or a substituted phenyl group

having one or more of a chlorine atom, an alkyl grup, an amino group, an alkylamino group and a dialkylamino group as substituents; the following general formula (II),



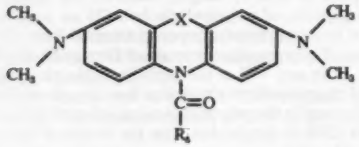
(II)

wherein R_4 is a



group, a

group or a $—NH(CH_2)_n—NH—$ group, and *n* is an integer of 1 to 5; or the following general formula (III)



wherein R_5 is an aryl group, a 3-pyridyl group or a 2-thienyl group, and X is —S—, —O— or —NH—.

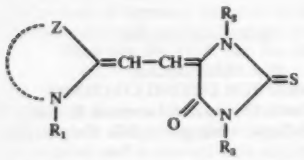
4,021,251

SILVER HALIDE PHOTOGRAPHIC EMULSIONS

Akira Sato; Akira Ogawa; Masanao Hinata, and Haruo Takei, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 16, 1975, Ser. No. 568,757
Claims priority, application Japan, Apr. 17, 1974, 49-42861
Int. Cl.² G03C *1/22*
U.S. Cl. 96—140 **22 Claims**

1. A silver halide photographic emulsion which contains at least one sensitizing dye represented by the formula (I)



(I)

wherein Z represents a group of atoms necessary to form a benzisoxazole nucleus; R_1 represents an aliphatic group; R_2 represents an aliphatic group or an aryl group; and R_3 represents an unsubstituted phenyl group or an alkenyl group.

4,021,252

JET PRINTING INK COMPOSITION

Daniel Philip Banczak, Neenah, and William Eric Tan, Appleton, both of Wis., assignors to American Can Company, Greenwich, Conn. and M & T Chemicals Inc., part interest to each

Continuation-in-part of Ser. No. 411,375, Oct. 31, 1973, abandoned. This application Feb. 7, 1975, Ser. No. 547,979
Int. Cl.² C09D *11/08, 11/14*
U.S. Cl. 106—30 **28 Claims**

1. An ink composition suitable for use in jet printing operations comprising a solution of the following components:
   a. between about 1 and 25 weight percent of shellac,
   b. between about 0.5 and 5 weight percent of a basic dye,
   c. between 0 and about 30 weight percent of a solvent modifier chosen from the group consisting of ethylene glycol monomethyl ther, ethylene glycol monoethyl ether, propylene glycol monomethyl ether and propylene glycol monoethyl ether,
   d. the remainder of said ink consisting of a blend of water and a lower aliphatic monohydric alcohol of no more than three carbon atoms, in a water-to-alcohol ratio of between 1 to 1.5 and 1 to 10, the proportions of said water and alcohol within such limits being such that said ink has a surface tension at 68° F. of between about 22 and 40 dyne cm., a viscosity at 68° F. of between about 1.75 and 5 cps., said ink having a pH of between 8.0 and 9.5 and a specific resistivity of less than 1000 ohm cm.

4,021,253

METHOD FOR MANUFACTURING GLASS FRIT

Ronald G. Budrick, Ann Arbor, Mich.; Frank T. King, Hillsboro, Oreg.; Robert L. Nolen, Jr., and David E. Solomon, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Apr. 5, 1974, Ser. No. 463,892
Int. Cl.² C03C *3/04*
U.S. Cl. 106—53 **9 Claims**

1. A method of manufacturing glass frit to serve as a raw material for the making of glass microspheres for use as laser fusion pellets which comprises:
   a. forming a glass gel containing an occluded material which expands upon heating,
   b. drying the gel at temperatures below the vaporization temperature of the occluded material to avoid driving off the occluded material and to form a block of dehydrated material,
   c. crushing the dehydrated block to form a glass frit,
   d. sieving the resulting glass frit to obtain a frit of a predetermined particle size,
   e. washing the sized frit in a volatile liquid, and
   f. drying the frit to control the moisture content.

4,021,254

REFRACTORIES USING BORIC ACID AND WATER SOLUBLE ALCOHOL BINDER

Günther L. Mortl, Zeno Goesstrasse 40, Villach, Austria (9500), and Johann Lederer, Millstaetterstrasse, Radenthein, Austria (9545)

Filed Mar. 19, 1976, Ser. No. 668,449
Claims priority, application Austria, Mar. 25, 1975, 2264/75
Int. Cl.² C04B *35/04, 35/42*
U.S. Cl. 106—58 **7 Claims**

1. A refractory material comprising magnesia or mixtures of magnesia and chromite, said refractory material including a binder comprising of a mixture of boric acid and a water soluble polyhydric alcohol.

4,021,255

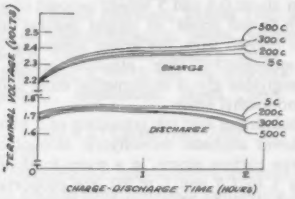
SINTERED BETA-ALUMINA ARTICLE PERMEABLE TO SODIUM AND POTASSIUM IONS AND METHODS FOR PRODUCING SAME

Takewo Chiku, Toyota; Kiyoshi Ninomiya, Nagoya; Takashi Yoshida, Nagoya; Takeshi Kogiso, Nagoya; Hiroaki Hayashi, Nagoya, and Noboru Matsui, Konan, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

Continuation of Ser. No. 327,172, Jan. 26, 1973, abandoned. This application Feb. 14, 1975, Ser. No. 549,915

Int. Cl.² C04B 35/10

U.S. Cl. 106—73.4 9 Claims



1. A method for producing a tantalum-containing sintered polycrystal beta-alumina article which is permeable to sodium and potassium ions and wherein the tantalum is distributed mainly at the grain boundaries of the beta-alumina single crystals, comprising the steps of mixing beta-alumina powder and a tantalum containing powder material selected from the group consisting of tantalum, tantalum oxide, tantalum hydroxide and mixtures thereof, the amount of tantalum in said tantalum containing material being 0.1 to 10% by weight of said beta-alumina powder, forming said mixed powders to a desired shape, and heating the same for sintering.

4,021,256

IMPREGNANT

Masamitsu Oda, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Japan

Filed Jan. 29, 1976, Ser. No. 653,628

Claims priority, application Japan, Feb. 14, 1975, 50-19068

Int. Cl.² C09D 1/02

U.S. Cl. 106—74 7 Claims

1. A water glass impregnant composition consisting essentially of SiO_2 in the range 23 to 24% by weight, Na_2O in the range 4.5 to 6.0% by weight, Li_2O in the range 0.20 to 0.22% by weight, glycerol in the range 0.5 to 1.0% by weight, and an organic anionic surfactant to lower the surface tension of the impregnant composition in the range of 0.01 to 2.0% by weight, the remainder of said composition being principally water.

4,021,257

CEMENTIOUS COMPOSITION FOR USE IN PREPARING POINTING COMPOUNDS OR MORTAR COMPOUNDS

Frank E. Bernett, Yardley, Pa., assignor to Tile Council of America, Inc., Princeton, N.J.

Continuation of Ser. No. 412,152, Nov. 2, 1973, abandoned, and a continuation of Ser. No. 430,214, Jan. 2, 1974, abandoned. This application July 9, 1975, Ser. No. 594,602

Int. Cl.² C04B 7/02, 7/352

U.S. Cl. 106—90 19 Claims

1. A cementious composition comprising, in the dry mix, 25 to 100% Portland cement, 0 to 75% filler, and 0.001 to 0.25% of the dry mix of a long-chain organic polymer which has a Flocculation Index less than 0.50.

4,021,258

CONCRETE STRUCTURE AND METHOD OF PREPARING SAME

Shinobu Uogaeshi, Kashiwara, Japan, assignor to Teijin Limited, Osaka, Japan

Division of Ser. No. 398,466, Sept. 18, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 535,123

Claims priority, application Japan, Sept. 25, 1972, 47-95078

Int. Cl.² C04B 7/02

U.S. Cl. 106—99 13 Claims

1. A concrete structure comprising a hydraulic or air set cement, a cloth fabric having a sufficiently open weave to permit the passage of cement paste therethrough, said cloth being disposed in the whole of the surface zone of said structure and short fibers having a diameter of 5–100 microns and a length of 5–30 cm contained in an amount of from 0.2–2% based on the weight of cement, said short fibers being uniformly dispersed throughout the structure and a portion of said fibers being intertwined with said cloth fabric.

4,021,259

GYPSUM COMPOSITION

Koei Komatsu, Tokyo; Kunihiro Harada, Yokkaichi; Seiji Aotani, Yokohama, and Akio Itabashi, Kawasaki, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 371,219, June 18, 1973, abandoned. This application July 24, 1975, Ser. No. 598,598

Claims priority, application Japan, June 19, 1972, 47-61113

Int. Cl.² C04B 11/14

U.S. Cl. 106—111 8 Claims

1. A gypsum composition obtained by molding and drying an aqueous slurry consisting essentially of (1) calcined gypsum, (2) 0.1 to 50% by weight, based on the weight of the calcined gypsum, of polyvinyl alcohol, (3) an aqueous solution of at least one metal compound selected from the group consisting of compounds of metals of Groups Ib, II, IIIa, IV, Vb, VIb, VIIb and VIII of the periodic Table, the amount of the metal compound being such that the ratio of metal atom to hydroxyl group in the polyvinyl alcohol is from 0.001 to 1, and (4) 50 to 120% by weight, based on the weight of the calcined gypsum, of water.

4,021,260

STARCH VISCOSITY CONTROL AGENT USING AN ETHOXYLATED FATTY ALCOHOL

Maria S. Crill, Lisle, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Division of Ser. No. 654,146, Jan. 30, 1976, abandoned. This application Sept. 16, 1976, Ser. No. 723,863

Int. Cl.² C08L 3/04, 3/10

U.S. Cl. 106—213 2 Claims

1. A process for preparing an improved gelatinized starch paste which contains from between 5 to 40% by weight of starch which comprises adding to said starch paste prior to gelatinization from 0.01 to 5% by weight based on the weight of the starch of a modified fatty alcohol which has been reacted with 2 – 10 moles of ethylene oxide and then gelatinizing said starch.

4,021,261

METHOD FOR DRYING COATINGS

Alan E. Ardis, North Haven, and Lawrence E. Katz, Woodbridge, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Jan. 13, 1976, Ser. No. 648,798

Int. Cl.² C09D 3/26; C09F 9/00

U.S. Cl. 106—264 6 Claims

1. A method for promoting drying of coatings containing drying or semi-drying oils which cure by oxidative polymeriza-

tion comprising incorporating therein at least 0.003% 5-methyl-1,10-phenanthroline.

4,021,262

COMPOSITION OF MATTER FOR THE COATING OF PLANT PRODUCTS FOR THEIR PRESERVATION AND PROCESS OF MAKING SAME

Josefina C. Morales Guerrero, Mexico, D.F., and Juan Manuel Lomelin Gallardo, Tlalpan, D.F., both of Mexico, assignors to Instituto Mexicano de Investicaciones Tecnologicas, A.C., Mexico City, Mexico

Continuation-in-part of Ser. Nos. 375,387, July 2, 1973, abandoned, and Ser. No. 375,386, July 2, 1973, abandoned. This application Jan. 15, 1975, Ser. No. 541,083

Int. Cl.² C08L *91/06*; **C09D** *3/387*

U.S. Cl. 106—271 **4 Claims**

1. A process for the preparation of an aqueous liquid coating comprising the steps of melting 20 to 60 parts of Candelilla wax, mixing in 5 to 10 parts of an unstable soap and more than 0.5 parts but less than 1.0 parts of toluene and/or xylene, adding water with mixing, said water being gradually added to form a water in oil emulsion, gradually adding additional water to a level in excess of 70 percent of the combined mixture to cause phase inversion and so as to form an oil in water emulsion having a wax particle size of between 0.1 microns and 0.1 millimicrons, and rapidly cooling said mixture, and unstable soap being the product of saponification of morpholine, triethanolamine, piperdine and/or ammonia with a fatty acid having a carbon chain between C_{12} and C_{22}.

4,021,263

POLISHING COMPOSITIONS

Marc Rosenblum, Milltown, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation-in-part of Ser. No. 214,719, Jan. 3, 1972, abandoned. This application Feb. 27, 1975, Ser. No. 553,704

Int. Cl.² C09G *1/02*

U.S. Cl. 106—288 B **4 Claims**

1. A polishing composition consisting essentially of:

a. from about 15% to about 50% of the weight of the composition alumina, said alumina having a particle size of less than about 3.0 microns;

b. from about 0.25% to about 25.0% by weight of the weight of the composition diamond, said diamond having a particle size less than about 3.0 microns but at least equal to that of the alumina; and

c. an inert, biologically safe, flowable carrier.

4,021,264

METHOD OF DISSOLVING A SILVER COATING IN A PHOTO TANK

Helmut Knorre, Seligenstadt, and Joachim Fischer, Grossauheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Oct. 20, 1975, Ser. No. 624,180

Int. Cl.² B08B *3/08*

U.S. Cl. 134—3 **6 Claims**

1. A process for the removal of the silver coating of a silver coated container comprising dissolving the coating by adding to the container and in contact with said coating an aqueous solution containing (a) 10–150 g/l of a member of the group consisting of an alkali peroxymonosulfate, an alkali peroxydisulfate and a mixture of an alkali peroxymonosulfate and an alkali peroxydisulfate, (b) 20–200 g/l of alkali bisulfate and (c) 5–100 g/l of thiourea.

4,021,265

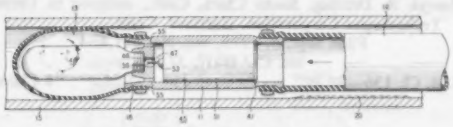
METHOD AND APPARATUS FOR CLEANING TUBULAR STRUCTURES

Robert Patrick Guenther, Middletown Township, Monmouth County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 4, 1975, Ser. No. 637,742

Int. Cl.² B08B *9/02*

U.S. Cl. 134—22 C **22 Claims**



1. Apparatus for cleaning the interior surfaces of a tubular structure, comprising:

first means adapted to expand into close fitting relationship with said interior surfaces of said tubular structure and to act as a wiper when so expanded;

a hollow pressurizable tube connected to said first means for positioning said first means at a desired location within said structure;

a source of fluid; and

second means operative in response to a predetermined sequence of changes in pressure of a fluid within said hollow tube for releasing fluid from said source into said first means to expand said first means.

4,021,266

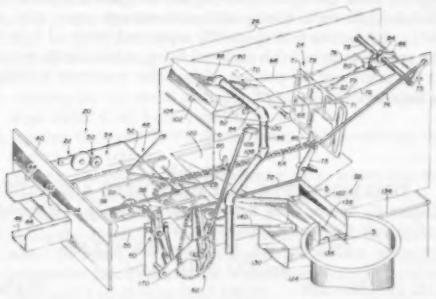
TRAY WASHING SYSTEM

Lawrence Pete Kitterman, 1309 Woodway, Hurst, Tex. 76053, and Howard Gene Rice, 1109 Hadrian Court, Irving, Tex. 75062

Continuation of Ser. No. 424,684, Dec. 14, 1973, abandoned, which is a division of Ser. No. 89,401, Nov. 13, 1970, Pat. No. 3,798,065. This application Oct. 9, 1975, Ser. No. 621,050

Int. Cl.² B08B *3/02*, *3/10*, *15/00*

U.S. Cl. 134—63 **7 Claims**



1. A tray washing apparatus comprising:

means for moving trays in sequence along a predetermined path;

means responsive to movement of the trays along the path for pivoting each tray into a substantially vertical orientation;

means located at a first point in the path for pouring a predetermined quantity of cleaning fluid over the food receiving surface of each tray while the tray is oriented vertically and thereby dislodging refuse therefrom;

said pouring means including a cleaning fluid reservoir mounted at said first point in the path for pivotal movement about a substantially horizontal axis and having a capacity at least as great as said predetermined quantity;

means located at subsequent points in the path for applying washing, rinsing and drying fluids to each tray; and

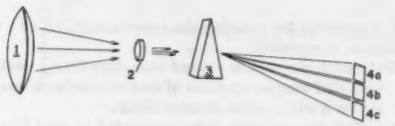
means located at the end of the path for stacking trays in a predetermined orientation.

4,021,267

HIGH EFFICIENCY CONVERTER OF SOLAR ENERGY TO ELECTRICITY

Joseph R. Dettling, Santa Clara, Calif., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sept. 8, 1975, Ser. No. 611,454
Int. Cl.² H01L *31/04*
U.S. Cl. 136—89 PC **4 Claims**



1. A high-efficiency converter of solar energy directly to electricity which comprises in combination:

a. concentrator means for concentrating the incident solar energy impinging thereon;

b. collimator means disposed in the path of radiation from said concentrator means for producing a beam of photons traveling in substantially parallel paths;

c. means for forming a spectrally separated beam of non-parallel photons from said beam fo substantially parallel photons, said means being disposed in the path of said substantially parallel photons; and

d. photovoltaic means for converting the solar energy in said spectrally separated beam of light directly into electricity, said means being disposed in the path of light coming from said spectral separating means but outside of the path of the low energy IR portion of the solar spectrum produced by said spectral separating means.

4. The converter of claim 1 wherein said means for converting the solar energy into electricity comprises a plurality of photovoltaic cells having different energy gaps, said cells being disposed in said spectrally separated beam of light with the energy gaps of each said cell being substantially matched to the energy of the portion of the solar spectrum in which it is disposed.

4,021,268

THERMOCOUPLE ASSEMBLY WITH A SHEATH

Eugene G. Smith, Long Beach, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

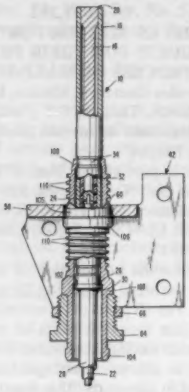
Filed Oct. 15, 1975, Ser. No. 622,556
Int. Cl.² H01L *35/04*
U.S. Cl. 136—228 **12 Claims**

1. A thermocouple comprising

coaxial inner and outer elongated thermocouple elements formed from respective dissimilar metals and having respective one ends joined to form a hot junction,

conductor means including inner and outer coaxial conductors of a metal dissimilar from at least one of said inner and outer elements joined to the respective other ends of the inner and outer thermocouple elements to form cold junctions means,

a thermoconductive sheath surrounding the thermocouple elements and being joined to the outer thermocouple element between the hot junction and the junction of the outer thermocouple element to the outer conductor, said junction of the sheath with the outer thermocouple element further being intermediate the hot junction and the junction of the inner thermocouple element to the inner conductor,



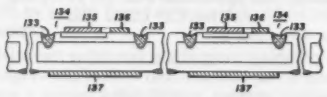
radiating means formed on the thermoconductive sheath for radiating heat energy.

4,021,269

POST DIFFUSION AFTER TEMPERATURE GRADIENT ZONE MELTING

Thomas R. Anthony, Schenectady; Mike F. Chang, Liverpool, and Harvey E. Cline, Schenectady, all of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,368
Int. Cl.² H01L *21/228*
U.S. Cl. 148—1.5 **12 Claims**



1. In the process of manufacturing a semiconductor device, the steps of:

supplying a body of semiconductor material containing an impurity which imparts one conductivity type;

forming a region of the opposite conductivity type in said body by migrating a second impurity therethrough by the temperature gradient zone melting process so as to define a P/N junction between said region and the surrounding portions of said body; and

subjecting said body to a diffusion cycle to make said P/N junction more uniform and improve the properties thereof.

4,021,270

DOUBLE MASTER MASK PROCESS FOR INTEGRATED CIRCUIT MANUFACTURE

Merrill Roe Hunt, San Diego, Calif.; Christopher Angelos Ladas, Tempe, and Sal Thomas Mastroianni, Mesa, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed June 28, 1976, Ser. No. 700,432
Int. Cl.² H01L *21/265*
U.S. Cl. 148—1.5 **16 Claims**

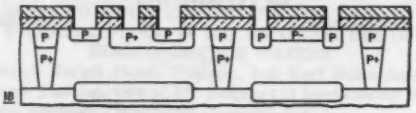
1. A self-aligned method of manufacturing integrated circuits comprising the steps of:

a. providing a buried layer and an upper layer over a semiconductor substrate, said upper layer and said buried layer being of a first conductivity type, and said substrate

being of a second conductivity type opposite to said first conductivity type;

b. forming a first masking means over the upper surface of said upper layer, said first masking means having a predetermined pattern of openings formed therein;

c. forming a first set of semiconductor device regions by selectively applying impurities through said predetermined pattern of openings of said first masking means;



d. removing said first masking means from said upper surface of said upper layer;

e. forming a second masking means over the upper surface of said upper layer, said first masking means having a predetermined pattern of openings formed therein; and

f. forming a second set of semiconductor device regions by selectively applying impurities through said predetermined pattern of openings of said second masking means.

4,021,271

ULTRAFINE GRAIN AL-MG ALLOY PRODUCT

Sidney G. Roberts, Livermore, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed July 7, 1975, Ser. No. 593,898

Int. Cl.² C22F 1/04

U.S. Cl. 148—2 **16 Claims**

5. A method of forming an ultrafine grained Al-Mg alloy product comprising:

a. casting an aluminum alloy consisting essentially of from about 2 to 9% by weight of magnesium, from about 0.75 to 5.0% total of aluminide forming transition elements selected from the group consisting of iron, nickel, cobalt and combinations thereof and the balance aluminum and inconsequential amounts of other elements, the weight ratio of magnesium to the total of the transition elements being greater than 2 to 1, the total aluminide content being greater than 2% and at least 1% magnesium existing as solute in the aluminum matrix, said casting conducted so that substantially all of the second phase transition element aluminide particles which form during casting do not exceed 5 microns in maximum dimension, and substantially all of the dendrite arm spacings are less than 75 microns,

b. working said cast alloy so as to impart thereto a level of cold work equivalent to at least a 50% thickness reduction by cold rolling, and

c. annealing said worked alloy at a temperature in excess of 200° C for sufficient time to recrystallize said worked alloy to form an average grain size less than 15 microns in maximum dimension.

4,021,272

METHOD OF ISOTHERMAL ANNEALING OF BAND STEELS FOR TOOLS AND RAZOR BLADES

Yoshiteru Asai, Yonago, and Sumio Yoshizoe, Yasugi, both of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Apr. 15, 1975, Ser. No. 568,197

Claims priority, application Japan, Apr. 19, 1974, 49-43389

Int. Cl.² C21D 1/48

U.S. Cl. 148—15 **5 Claims**

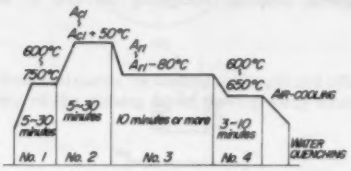
1. A method of isothermal annealing of a hot-rolled band steel selected from the group consisting of a tool steel and a stainless steel comprising the successive steps of:

converting a coil of said hot-rolled band steel into an open coil with its convolutions spaced apart a distance great enough to allow a molten salt to pass therethrough;

immersing said open coil in a molten salt bath held at a temperature in a range of from 550° to 750° C for a period of 5 to 30 minutes to preheat the open coil and cause preliminary precipitation of carbides;

immersing the preheated open coil in a molten salt bath held at a temperature in a range of from a temperature immediately above Ac_1 point to the temperature of Ac_1 point plus 50° C for a period of 5 to 30 minutes to make the steel austenitic in structure;

immersing the open coil in a molten salt bath held at a temperature in a range from a temperature immediately



below Ar_1 point to the temperature of Ar_1 point minus 80° C for a period of at least 10 minutes to complete the isothermal transformation and to provide a steel product containing carbides having a small spheroidal structure of uniform size and exhibiting good cold workability and hardenability;

further heating the open coil after said isothermal transformation at a temperature of 600° to 650° C for a period of three to ten minutes; and

thereafter air-cooling the open coil.

4,021,273

HYSTERESIS ALLOY

Ralph M. Handren, Crystal Lake, Ill., and John P. McKay, Walworth, Wis., assignors to Arnold Engineering Company, Marengo, Ill.

Division of Ser. No. 554,350, Feb. 28, 1975. This application Oct. 1, 1975, Ser. No. 619,144

Int. Cl.² H01F 1/00

U.S. Cl. 148—121 **7 Claims**

1. A method for producing a magnetic alloy having stable magnetic properties consisting essentially of about 14 to 17% nickel, 7 to 11% aluminum, 0.5 to 10% cobalt, 0.1 to 2.0% silicon and the balance substantially all iron comprising the steps of:

A. heating the aforesaid components to a temperature of at least 1650° C to form a melt,

B. casting the melt in a suitable mold and permitting the casting to solidify,

C. heating the casting for a sufficient time to insure that the whole mass is substantially uniformly heated;

D. cooling the casting, and

E. aging the casting to produce a Rockwell hardness on the order of about C46 and substantially uniform magnetic properties throughout with a maximum energy product (BH max.) of at least 0.85 MGO.

4,021,274

METHOD FOR HEAT TREATING BY INDUCED CURRENT

Donald H. Chadwick, Geneva, Ohio, assignor to Russell, Birdsall & Ward, Inc., Mentor, Ohio

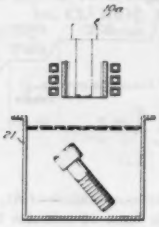
Filed Mar. 26, 1975, Ser. No. 562,111

Int. Cl.² C21D 1/10

U.S. Cl. 148—146 **6 Claims**

3. A method of hardening steel workpieces in localized areas to closely controlled depths of hardening with a high degree of symmetry and uniformity, the workpieces comprising screws, bolts or fasteners, or the like having a head portion

of relatively large outside diameter and a shank portion of relatively small outside diameter, the method comprising the steps of: providing an inductor coil having an inside diameter greater than the maximum outside diameter of the workpieces, unidirectionally feeding the workpieces including the heads thereof axially through the coil with a dwell at a position when each workpiece shank is surrounded by the coil and is substantially centered with respect to the electromagnetic field produced thereby, the spacing between said shank and coil materially exceeding the spacing required for close electromagnetic coupling, energizing the coil to accomplish



loosely coupled induction heating of each workpiece shank with the coil and any intervening insulator means spaced from the shank by at least the distance by which the head of the workpiece protrudes radially beyond the shank with however a sufficiently high rate of heat generation to raise the metal in the localized areas to austenitizing temperature at locations shallower than the desired depth of hardening without heat penetration to austenitizing temperature occurring below the desired depth of hardening, and quenching the workpiece by subjecting it to coolant fluid to accomplish rapid cooling prior to the occurrence of austenitizing heat penetration below the desired depth of hardening.

4,021,275

GAS-GENERATING AGENT FOR AIR BAG

Kazuo Kishi, and Kazuo Naganuma, both of Himeji, Japan, assignors to Daicel, Ltd., Osaka, Japan

Filed Oct. 29, 1975, Ser. No. 626,725

Claims priority, application Japan, Apr. 23, 1975, 50-49413; Apr. 23, 1975, 50-49414; Apr. 30, 1974, 49-52194

Int. Cl.² C06B *35/00*

U.S. Cl. 149—35 **7 Claims**

1. A gas generating agent consisting essentially of finely divided particles of a co-precipitation product obtained by the steps of

1. preparing a uniform aqueous solution consisting essentially of (a) an azide component consisting of one or a mixture of two or more azides selected from the group consisting of alkali metal azides and alkaline earth metal azides, and (b) an oxidant component consisting of one or a mixture of two or more oxidants selected from the group consisting of alkali metal nitrates, alkali metal perchlorates, alkaline earth metal nitrates and alkaline earth metal perchlorates;
2. adding said aqeous solution to water-soluble organic solvent and thereby precipitating a co-precipitation product of (a) and (b) wherein the weight ratio of a/b is in the range of from 95/5 to 50/50;
3. separating and drying the co-precipitation product.

4,021,276

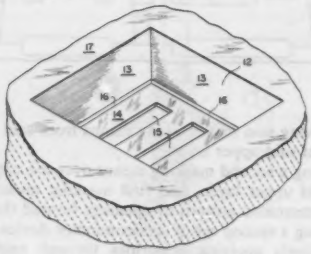
METHOD OF MAKING RIB-STRUCTURE SHADOW MASK FOR ION IMPLANTATION

Kon Ho Cho, West Windsor Township, Mercer County, and Peter David Parry, Montgomery Township, Somerset County, both of N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 645,146

Int. Cl.² H01L *7/50*

U.S. Cl. 156—644 **9 Claims**



1. A method of fabricating a shadow mask from a semiconductor wafer, which comprises:

doping a first region adjacent one surface of the semiconductor wafer to render the first region etch-resistant in an etching process that preferentially etches the undoped portions of the wafer;

machining a plurality of cavities into the other surface of the semiconductor wafer, leaving a web at the bottom of each cavity thicker than the first region, the walls of the cavities being substantially perpendicular to the surfaces of the wafer;

forming openings in the webs to define the pattern for the shadow mask; and

subjecting the wafer to the preferential etching process to reduce the webs to substantially the thickness of the first region.

4,021,277

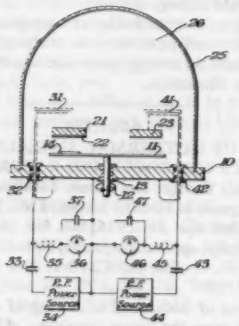
METHOD OF FORMING THIN FILM RESISTOR

George A. Shirn, Williamstown, and William J. Pfister, Cheshire, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed Dec. 7, 1972, Ser. No. 313,065

Int. Cl.² C23F *1/02*

U.S. Cl. 156—657 **8 Claims**



1. A method of forming a thin resistor film comprising, depositing by co-sputtering a metastable alloy film on a substrate, said sputtering being accomplished by the simultaneous sputtering of chromium and nickel, the ratio of the sputtering

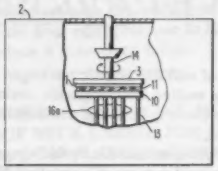
rates of chromium and nickel being adjusted such that the sputtered resistor film composition is substantially ⅘ chromium and ⅕ nickel by weight, annealing said resistor film, determining the geometry of said film by a normal photo-etch process, and providing electrical contacts at distal surface regions of said resistor film.

4,021,278

REDUCED MENISCUS-CONTAINED METHOD OF HANDLING FLUIDS IN THE MANUFACTURE OF SEMICONDUCTOR WAFERS

Roderick Kermit Hood, Williston, and Karl Heinz Raacke, Essex Junction, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 12, 1975, Ser. No. 640,118
Int. Cl.² H01L *21/68*
U.S. Cl. 156—626 **13 Claims**



1. A method for static liquid treatment of a surface of a semiconductor wafer with a liquid capable of forming a meniscus on said wafer having a liquid surface parallel to said wafer surface at a given distance from said wafer surface comprising:

supporting said wafer upon a rotatable means and providing in superimposed proximity thereof a means for limiting the space height distance between said wafer and said limiting means, said space height distance being less than said given distance,

forcing predetermined volume of fluid between said wafer and distance limiting means so as to form a meniscus of said liquid at the periphery of said wafer, whereby the entire surface of said wafer is covered with said liquid in a meniscus formed body of less dimension than normally formed in the absence of said limiting means,

statically maintaining said liquid meniscus body on said wafer until reaction betwen said liquid and wafer surface is accomplished as predetermined,

determining the predetermined completion of said reaction, spinning said wafer to apply centrifugal force to said wafer and liquid body at the time of sensing the predetermined reaction is complete thereby immediately removing the reactant liquid from the wafer.

4,021,279

METHOD OF FORMING GROOVE PATTERN

Gilles Gerardus Hirs, Overath-Marialinden, Germany, assignor to Stichting Reactor Centrum Nederland, Netherlands

Continuation-in-part of Ser. No. 352,331, April 18, 1973, abandoned. This application Sept. 18, 1975, Ser. No. 614,662
Claims priority, application Netherlands, Apr. 20, 1972, 7205289
Int. Cl.² C23F *1/02*
U.S. Cl. 156—654 **9 Claims**

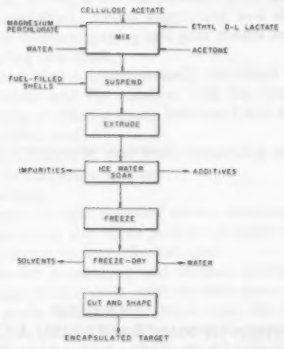
1. A method of etching a surface groove pattern in the homogeneous material surface of a ball comprising the steps of: supporting an undeformable, incompressible and noncorrodible template at a short distance from said ball surface in the area corresponding to where a surface pattern constituting a groove pattern is desired to be formed when the template is provided with canals according to the desired pattern, flowing an etching liquid through said canals in the template along the ball surface in a laminar flow path, wherein the short distance between the template into which said canals are formed and the ball surface simultaneously minimizes the effect of said etching liquid flowing between the template and the ball surface away from said canals, by limiting the length and effective flow velocity of the etching liquid flowing away from said canals.

4,021,280

METHOD OF MAKING FOAM-ENCAPSULATED LASER TARGETS

James A. Rinde, and Fred J. Fulton, both of Livermore, Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 2, 1975, Ser. No. 609,642
Int. Cl.² B29D *27/00*
U.S. Cl. 156—80 **10 Claims**



1. A method for encapsulating fuel capsules in a foam having a low density and a cell size of up to about 2 μm consisting of the steps of: suspending fuel capsules in a cellulose acetate solution, extruding the suspension through an orifice into a bath of water forming a strand of cellulose acetate gel containing the fuel capsules, soaking the gel strand in the water bath to extract additives therefrom, freezing the thus soaked gel strand, freeze-drying the thus frozen gel strand wherein water and solvents therein sublime and the gel structure solidifies into a strand of low density microcellular foam containing the fuel capsules therein, and cutting the foam strand at a selected distance from the fuel capsules.

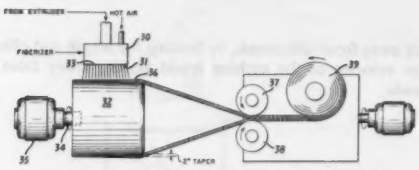
2. The method defined in claim 1, additionally including the step of attaching a support member to the thus cut fuel capsule containing foam.

3. The method defined in claim 2, wherein the step of attaching the support member is carried out by utilizing a hollow stalk as the support member and gluing the hollow stalk to the foam.

4,021,281
CONTINUOUS PRODUCTION OF NONWOVEN TUBULAR WEBS FROM THERMOPLASTIC FIBERS AND PRODUCTS

David B. Pall, Roslyn Estates, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Continuation-in-part of Ser. No. 393,688, Aug. 31, 1973, Pat. No. 3,933,557. This application Nov. 25, 1975, Ser. No. 635,481
Int. Cl.² D04H 3/16
U.S. Cl. 156—167 9 Claims



1. A process for forming flexible nonwoven webs of thermoplastic fibrous material in a seamless tubular configuration and in continuous lengths, which comprises spinning molten thermoplastic material in the form of a plurality of fibers from a spinning die having a plurality of orifices spaced equidistantly from a collecting surface on the exterior of a rotating mandrel; applying a gas blast at the orifices of the spinning die directed generally in the direction of projection of the fibers from the orifices, attenuating and disrupting the fibers into discrete lengths of a diameter below 6 μ; and collecting and winding the fibers directly on the collecting surface to form thereon a nonwoven flexible tubular web of randomly oriented heterogeneously intertwined spun fibers, withdrawing the flexible tube of nonwoven fibrous material from the mandrel; and flattening the tube to form a double layer web with the edges held together and therefore nonravelling.

4,021,282
METHOD OF MANUFACTURING A CONTACT BODY

Per Norback, Lidingo, Sweden, assignor to Aktiebolaget Carl Munters, Sollentuna, Sweden

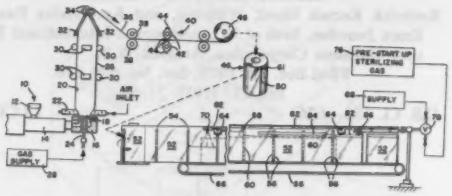
Filed Apr. 1, 1975, Ser. No. 564,117
Claims priority, application Sweden, Apr. 9, 1974, 7404816
Int. Cl.² B05D 1/18, 1/38, 3/02, 3/04
U.S. Cl. 156—210 10 Claims

1. A method of manufacturing a contact body for at least one flowing medium comprising the steps of forming layers of asbestos fibers arranged so that the layers bear against one another at mutually spaced positions to provide channels in the body extending from end to end for the media; treating said layers to produce a hydrated substantially non-water-soluble precipitate on the asbestos fibers of the layers, heating the layers so treated to a temperature which is at least within a temperature range at which the hydrated precipitate releases its water of crystallization but which is below the sintering temperature of the body and, thereafter repeating said treating step thereby to restore the mechanical strength of the body lost by transformation of the asbestos fibers during the heating step.

4,021,283
METHOD OF MAKING ASEPTIC PACKAGING

Roy J. Weikert, c/o General Films, Inc., 2000 Schlater Drive, Sidney, Ohio 45365

Continuation-in-part of Ser. No. 436,104, Jan. 24, 1974, Pat. No. 3,941,306, which is a division of Ser. No. 256,769, June 23, 1972, Pat. No. 3,813,845. This application June 2, 1975, Ser. No. 582,866
Int. Cl.² B65D 27/10
U.S. Cl. 156—244 11 Claims



1. A method of making aseptic packages comprising:
a. extruding a molten thermoplastic resin through a tube-forming die thereby forming a continuous, closed tubing of extrudant,
b. forming a bubble at said die by blowing a noncontaminating gas into said tubing of extrudant thereby producing tubing having a sterile interior,
c. after said tubing has solidified to a nonmolten state, collapsing said tubing into flattened web thereof,
d. forming a series of longitudinally spaced seal lines extending from one longitudinally extending edge of said flattened web of tubing to a point adjacent to but spaced from an opposite longitudinally extending edge thereof while maintaining a substantially sterile condition within said tubing,
e. said transversely extending seal lines thereby defining a series of interconnected, sterile bags and a continuous, sterile channel extending along said opposite longitudinally extending edge of said web of tubing forming a completely closed sterile system of interconnected bags communicating with each other in said closed system by means of said sterile channel,
f. inserting a hollow filling tube into said channel without slitting said channel open lengthwise thereof,
g. filling said bags through said filling tube with an aseptic product within a controlled, sterile environment, and
h. sealing said bags along a line disposed beneath said channel.

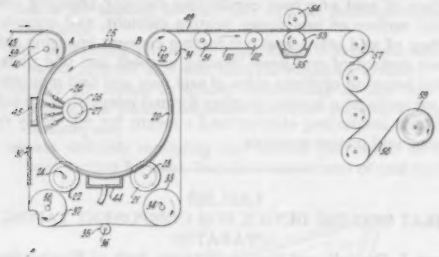
4,021,284
NONWOVEN FABRIC AND METHOD AND APPARATUS FOR PRODUCING THE SAME

Frank Kalwaites, Gladstone, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation of Ser. No. 306,108, Nov. 13, 1972, abandoned, Continuation-in-part of Ser. No. 114,449, Feb. 11, 1971, abandoned. This application Mar. 6, 1975, Ser. No. 555,760
Int. Cl.² B32B 7/14
U.S. Cl. 156—277 7 Claims

1. A method for producing a nonwoven fabric having opposed generally parallel planar surfaces with different properties from a layer of staple length fibers comprising: supporting the layer of fibers on a foraminous support member, said support member having from about 200 to 8100 openings per square inch to provide from about 20% to 70% open area in said support member, said fibers having a length sufficient to span at least two of said openins, directing fiber rearranging fluid forces against the fibrous layer while it is supported to rearrange the fibers in the layers into a predetermined pattern of the yarn-like fiber bundles and areas of low fiber density, removing said fluid forces through the foraminous support

member to force opposite fiber ends through different openings in the support member so that substantially all fiber ends protrude from one surface of the fabric, removing the rearranged layer from the foraminous support member and applying a binder material only to the surface of said rearranged layer from which the fiber ends protrude to bind the fiber ends together and produce a nonwoven fabric.



4,021,285

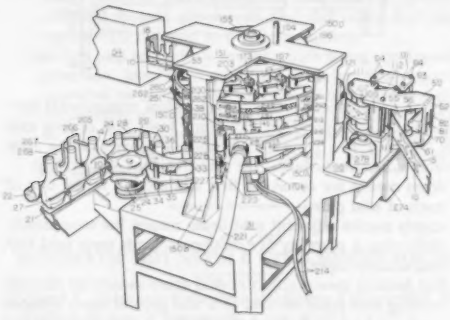
APPARATUS FOR PRODUCING SHRUNKEN PILFER-PROOF NECK LABELS FOR CONTAINERS

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 526,124, Nov. 22, 1974. This application June 8, 1976, Ser. No. 693,996

Int. Cl.² B29D *23/10;* **B29C** *17/00, 27/00*

U.S. Cl. 156—446 **3 Claims**



1. A mandrel turret apparatus comprising

a frame,

a central shaft rotatably mounted on said frame,

a circular hub on said shaft for rotation, drive means connected to said shaft for rotating it,

means feeding label blanks to the mandrels in succession at a feed station adjacent the orbital path of the mandrels,

plural mandrel means carried on the hub at equally spaced apart intervals for movement in an orbital path about said shaft and past said feed station whereat a blank is engaged,

vacuum means on each of the mandrels for holding an engaged leading portion of a blank on the surface, the length of the blank exceeding the peripheral dimension of the mandrel,

drive means individually connected to the mandrels and operated in response to movement of the mandrels past the feed station for winding the engaged blank about the mandrel and overlapping the leading and trailing ends,

heating means applying heat to the overlapping ends of the blank on the mandrel,

a roller means rotatable on an axis parallel with the mandrel axis, and

means supporting the roller means on the frame in the orbital path of the mandrels for engagement in succession with the overlapping heated ends of the blanks on the mandrels orbitally traveling past the roller means, said support means including a yieldable connection of the roller means to the frame, whereby the roller means yieldably compresses the overlapped heated ends of the blank to form a seam thereon.

4,021,286

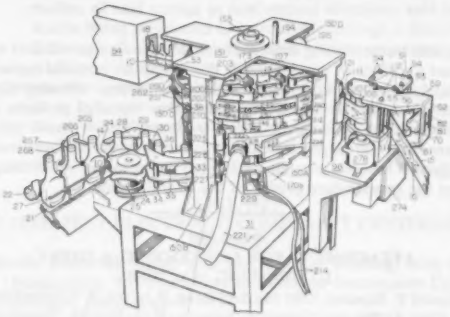
APPARATUS FOR PRODUCING SHRUNKEN PILFER-PROOF NECK LABELS FOR CONTAINERS

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 526,124, Nov. 22, 1974. This application June 2, 1976, Ser. No. 692,157

Int. Cl.² B29D *23/10;* **B29C** *17/00, 77/00*

U.S. Cl. 156—446 **7 Claims**



1. A mandrel apparatus for winding a blank of flexible sheet-like material thereon to a hollow sleeve form comprising

a rotatable shaft, having a central passage, gear means on one end of said shaft, means supporting said shaft for rotation, drive means engaging said gear means and operable for rotating said shaft,

a hollow mandrel sleeve concentrically mounted on said shaft at its other end for rotation with the shaft, said sleeve providing an interior space between it and the shaft near its said other end,

a lateral aperture means in said shaft connecting said central passage to said annular space,

a source of vacuum,

radial port means in said mandrel sleeve connecting the annular chamber to the other peripheral surface of the sleeve for applying vacuum thereat, and

means operable for connecting said vacuum source to the central passage of said shaft, said vacuum upon connection to said ports attaching the blank onto the mandrel sleeve, the drive means being operable for rotating the mandrel shaft and winding a blank of said material about the outer peripheral surface of said mandrel sleeve.

4,021,287

APPARATUS FOR FLAME BONDING BY USE OF HIGH VELOCITY, HIGH TEMPERATURE DIRECT FLAME

Wilhelm N. Martin, Grand'Mere, Canada, assignor to Consolidated-Bathurst Limited, Montreal, Canada

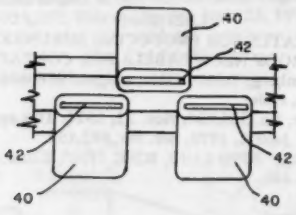
Continuation-in-part of Ser. No. 399,015, Sept. 12, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,167, Jan. 27, 1972, Pat. No. 3,783,062. This application Sept. 9, 1975, Ser. No. 611,729

Int. Cl.² B32B *31/26, 31/12*

U.S. Cl. 156—497 **10 Claims**

1. An apparatus suitable for bonding materials together comprising bonding means, means for supplying a supply of at least one bondable thermoplastic material and at least one further material to said bonding means, burner means, said burner means comprising at least two rows of burners in a

staggered relationship to each other to obtain a substantially continuous and uniform temperature line across the width of the material being treated, means for supplying said burners with a combustible fuel, said supply means being adapted to supply said burners such that when said combustible fuel is burnt, said burners produce a flame having a flame velocity of about 10,000 feet per minute at a temperature of above 1,000°



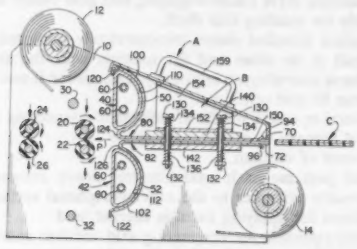
F., said burners being directed such that the flames will heat at least a surface of said bondable thermoplastic material immediately prior to entering the bonding means whereby the heated surface is bonded to the further material to form a substantially uniformly bonded laminate, and wherein said burners are arranged in such a manner that the flames from adjacent burners overlap each other so as to aid in levelling out the temperature profile of the overall flame.

4,021,288

ATTACHMENT FOR CONVERTING A SHEET LAMINATING MACHINE

Donald F. Hannon, 7391 Markell Road, R.D. No. 3, Willoughby, Ohio 44094, and George E. Swingle, P.O. Box 84, Honeoye, N.Y. 14471

Filed July 2, 1975, Ser. No. 592,606
Int. Cl.² B30B *15/34*
U.S. Cl. 156—499 **2 Claims**



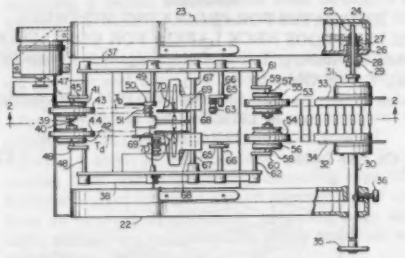
1. An attachment for use on a sheet laminating machine including two vertically spaced upper and lower heating elements defining therebetween a sheet workpiece pass for movement of sheet material between said heating elements from front to back thereof, each of said heating elements having a front facing, curvilinear heated donor surface extending transversely of said workpiece pass and spaced from said pass, and two vertically spaced pressure rolls extending transversely of said pass with one of said rolls on each vertical side of said pass, said rolls being spaced from the back of said heating elements for pressing together heated material traveling along said workpiece pass, said attachment comprising: first and second heat conducting elements formed from a metal having high thermal conductivity, each of said heat conducting elements having a generally flat platen plate and an integral heat receptor portion, means for securing said platen plates together in general parallel relationship, said heat receptor portion of one of said heat conducting elements having a receptor surface generally matching the donor surface of said upper heating element, the heat receptor portion of the other of said heat conducting elements having a receptor surface generally matching the donor surface of said lower heating element, and means for releasably mounting said attachment onto said heating elements with said receptor surface of said one heat conducting element engaging said donor surface of said upper heating element, said receptor surface of said other heat conducting element engaging said donor surface of said lower heating element and said platen plates being on opposite sides of said pass and said mounting means includes a hanger member formed integrally with said one heat conducting element and a means for releasably receiving said hanger member.

4,021,289

HEAT SEALING DEVICE FOR COMPONENT TAPING APPARATUS

Frank J. Orzelek, and Roy M. Whiting, both of Binghamton, N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,375
Int. Cl.² B65B *15/04;* **C09J** *5/06*
U.S. Cl. 156—499 **6 Claims**



1. In an apparatus for receiving electrical components having coaxially and oppositely extending leads and sealing said leads between two pairs of continuous tapes, having heat activable adhesive surfaces, the improvement comprising:

a drum means for receiving first and second tapes, one of each of said pairs;

a supply means adjacent said drum means for sequentially delivering a plurality of component leads onto said first and second tapes;

a first heating means adjacent said drum means for directly heating said leads on said first and second tapes without applying heat directly to said first and second tapes and heat sealing said leads to said first and second tapes by contact of said heated leads against said heat activable adhesive surfaces; and

a roller means adjacent said drum means for receiving third and fourth tapes, one of each pair, and sealing said third and fourth tapes to said first and second tapes, respectively.

4,021,290

BAG SEALER APPARATUS

Kevin R. Smith, Leawood, Kans., assignor to Dazey Products Company, Kansas City, Mo.

Filed Aug. 16, 1976, Ser. No. 714,649
Int. Cl.² B30B *15/34;* **B26D** *5/08*
U.S. Cl. 156—510 **13 Claims**

1. Apparatus for making and sealing bags or the like, comprising:

a base section presenting a first elongate material-engaging surface;

a closure section presenting a second elongate material-engaging surface;

means mounting said closure section for movement thereof between a material-engaging position where said first and

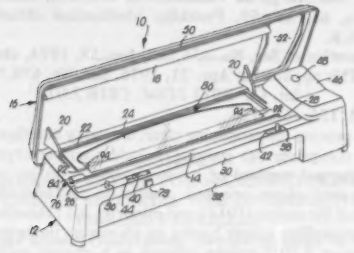
second material-engaging surfaces are oppositely disposed for engagement with the opposite sides of a section of bag-making material, to an open position permitting positioning of bag-making material between the sections;

means for heating at least one of said material-engaging surfaces;

first upstanding pin means supported by said base and located adjacent said first material-engaging surface;

second pin means in spaced relationship to said first pin means and located adjacent said first material-engaging surface; and

means shiftably mounting said second pin means on said base section for back-and-forth movement of said second



pin means relative to said first pin means, and for biasing said second pin means in a direction away from said first pin means, said shiftable mounting means including an elongated strap member formed of resilient synthetic resin material and having one end thereof operatively coupled to said pin means and the other end thereof operatively coupled to said base section,

said first and second pin means which being configured for insertion into corresponding complemental apertures provided in the opposite margins of bag-making material for locating and holding said bag-making material relative to said material-engaging surfaces during sealing operations when said sections are in said material-engaging disposition.

4,021,291

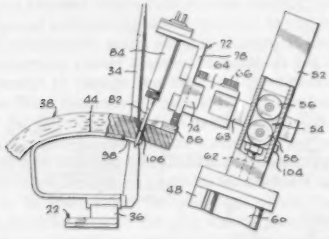
AUTOMATIC HOT NEEDLE ATTACHMENT FOR BAG WICKETER

Richard L. Joice, c/o Universal Machinery Corporation, 8955 Fullbright Ave., Chatsworth, Calif. 91311

Filed Oct. 9, 1975, Ser. No. 621,119

Int. Cl.² B32B *31/00*

U.S. Cl. 156—513 **14 Claims**



1. A hot needle device for positioning as a station of a bag machine in a line of equipment for the automatic production and handling of thermoplastic bags, said hot needle device being for the attachment together into a unit of a plurality of thermoplastic bags as they are delivered to it by the line;

a machine frame;

a rail mounted on said machine frame and extending along the length thereof;

a plurality of carriages movably mounted on said rail for unidirectional movement in a first direction to and away from said hot needle device;

at least two wickets on each of said carriages for receiving thermoplastic bags and retaining them for carriage to and from said hot needle device, said hot needle device comprising;

a bracket for mounting said device on said machine frame adjacent a station where a plurality of stacked thermoplastic bags are supported on said wickets on a carriage;

a guide mounted on said bracket;

a carrier movably mounted with respect to said guide along a line in a second direction transverse to said first direction;

a hot needle mounted on said carrier, said hot needle being oriented in a direction substantially parallel to the line of motion of said carrier in said second direction, said hot needle being positioned to be movable through a stack of thermoplastic bags located on said wickets on a carriage positioned at the station; and

means for moving said hot needle in said second direction along its length so that said hot needle penetrates through the stack of thermoplastic bags at the station to weld the stack of bags into a separable unit.

4,021,292

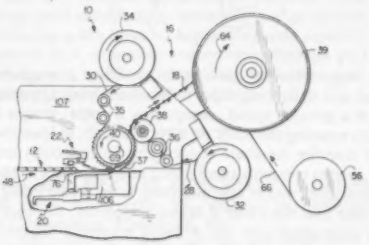
TAPED BELT ELECTRONIC COMPONENT CENTERING DEVICE

Erwin Frederick Bates, and Roy Marvin Whiting, both of Binghamton, N.Y., assignors to Universal Instruments Corporation, Binghampton, N.Y.

Filed May 14, 1976, Ser. No. 686,503

Int. Cl.² B32B *31/04*; B65B *47/24*

U.S. Cl. 156—552 **5 Claims**



1. In an electronic component taping machine including:

conveyor means for transporting constrained, leaded electronic components on said conveyor in any preferred sequence, lead portions of said components resting on said conveyor means in substantially prestraightened condition and in a common plane where constrained by said conveyor;

lifting means for removing said components from said conveyor means prior to taping; and including a taping means for applying adhesive tape to the leads of said components so as to form an ordered belt of taped electronic components; and

the improvement therein comprising a device to center said components on said conveyor means, said centering device compared of a pair of juxtaposed elongated blades centered over said conveyor means and oriented in the direction of travel of said components, each of said blades pivoted at one end, the other end of said blades, when pushed, swinging apart in unison and in symmetric motion in opposition to a biasing force tending to bring said blades together, the upper surfaces of said blades generally coplanar and substantially adjacent said coplanar

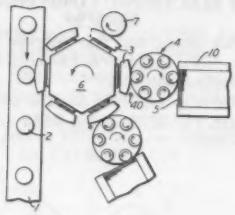
lead portions of said components moving on said conveyor means, the spacing between said blades sufficient at said pivoted ends to allow entrance therebetween of dependent portions of said leaded electronic components moving on said conveyor means, said spacing between blades diminishing in the direction of component motion and causing interference contact between said blades and said dependent portions, said dependent portions, moving with said conveyor means, exerting forces on said blades when contact occurs therebetween, the force of contact with one blade translating said component transversely to the direction of conveyor travel, the force of contact with two blades pivoting said blades apart allowing said dependent portion to pass therebetween, said biasing force thereafter returning said blades to a closed position.

4,021,293

HIGH SPEED LABELING MACHINE

Robert V. Total, St. Marys, Pa., assignor to Stackpole Machinery Company, Johnsonburg, Pa.

Filed Nov. 7, 1975, Ser. No. 629,908
Int. Cl.² B65C *9/14*; B65H *3/12, 3/40*
U.S. Cl. 156—568 **8 Claims**



1. Apparatus for picking labels from a magazine at one speed and delivering them to label-applying apparatus traveling at a greater speed, comprising a rotor, means for continously rotating the rotor on a vertical axis, at least two pairs of label transfer members spaced circumferentially around said axis, means rotatably connecting said members to the rotor on vertical axes, one of said members in each pair being a pick-up member and the other a delivery member, the pick-up members alternating with the delivery members, means for continously rotating the pick-up members in one direction and the delivery members in the opposite direction at the same speed, each pick-up member rotating on its axis in a direction opposite to the direction of rotation of the rotor, each of said transfer members having a label-contact surface provided with a vertical row of air passages, and of said contact surfaces facing away from the axis of the rotor when any pick-up member is in pick-up position at a label magazine, means for applying suction to the air inlets in the pick-up member at said pick-up position to withdraw a label from the magazine, means for subsequently releasing said suction and applying suction to the air inlets in the delivery member of the same pair when their contact surfaces are directly opposed to each other to thereby transfer the label from the pick-up member to the delivery member, the contact surface of the delivery member facing away from the axis of the rotor when the delivery member is in delivery position beside traveling label-applying apparatus, and means for releasing the suction at the delivery member after the label has been delivered to the label-applying apparatus, the rotation of said rotor aand delivery members combining to move the contact surface of the delivery member that is in delivery position forward at substantially the same speed as the adjoining surface of the label-applying apparatus.

4,021,294

PROCESS FOR PRODUCING AMETHYST CRYSTALS

Valentin Evstafievich Khadzhi, ulitsa Institutskaya, 14, kv. 8; Evgeny Matveevich Tsyganov, ulitsa Krasnoi Molodezhi, 4, kv. 56, both of Alexandrov Vladimirskoi oblasti; Leonid Iosifovich Tsinober, Novocheremushinskaya ulitsa, 55, korpus 1, kv. 10, Moscow; Zhanneta Viktorovna Novozhilova, ulitsa Krasnoi Molodezhi, 4, kv. 63, Alexandrov Vladimirskoi oblasti; Galina Vasilievna Reshetova, ulitsa Lenina, 24, kv. 6, Alexandrov Vladimirskoi oblasti; Mikhail Isaakovich Samoilovich, ulitsa Krasnoi Molodezhi, 4, kv. 64, Alexandrov Vladimirskoi oblasti; Vladimir Petrovich Butuzov, Sirenevy bulvar, 45, kv. 55; Anatoly Alexandrovich Shaposhnikov, 5 Vatutinsky pereulok, 31, kv. 10, both of Moscow, and Margarita Vladimirovna Lelekova, ulitsa Krylovskaya, 6a, kv. 69, Pushkiho Moskovskoi oblasti, all of U.S.S.R.

Continuation of Ser. No. 434,562, Jan. 18, 1974, abandoned. This application Apr. 21, 1976, Ser. No. 678,744
Int. Cl.² B01J *17/04*; C01B *33/12*
U.S. Cl. 156—623 Q **5 Claims**

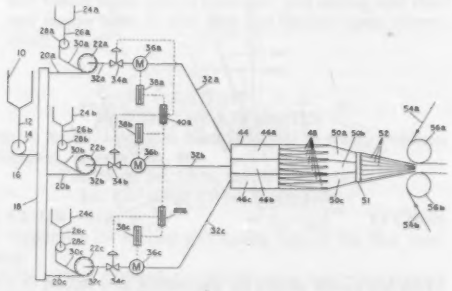
1. A process for producing clear, unsmoky amethyst crystals which comprises (a) growing colorless quartz crystals by a hydrothermal method of a temperature drop on crystalline quartz seed plates oriented parallel to the crystallographic planes of the major $\{10\bar{1}1\}$ and minor $\{1\bar{1}01\}$ rhombohedrons using crystalline quartz having an aluminum impurity content of at most 5.10^{-3} weight percent as a charge; said growing being effected from aqueous solution of potassium carbonate or potassium hydroxide, the solution having a concentration ranging from 4 to 7 weight percent and containing iron in the form of a substance selected from the group consisting of metallic iron, and its oxide and hydroxide compounds, in an amount ranging from 5 to 30 g/l of the solution and an oxidizing agent selected from the group consisting of lithium nitrate, lithium nitrite and manganese nitrate in an amount ranging from 1 to 10 g/ml of the solution of potassium compounds; said growing of colorless quartz crystals being effected at a crystallization temperature within the range of from 300° to 500° C under a pressure of from 200 to 1,700 kg/cm² and a crystal growth rate of from 0.05 to 0.5 mm/day; and (b) exposing the thus-grown colorless quartz crystals to an ionizing irradiation.

4,021,295

METHOD AND APPARATUS FOR SUPPLYING WHITE WATER FROM A SINGLE SILO IN THE FORMATION OF A MULTI-PLY WEB

John F. Schmaeng, Rockton, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed May 5, 1975, Ser. No. 574,606
Int. Cl.² D21F *1/06, 1/66, 11/04*
U.S. Cl. 162—125 **10 Claims**



9. A method of delivering separate streams of liquid containing fibers for use in forming a composite multi-ply web comprised of layers formed from the separate streams comprising the steps of:

1. providing a single source of pressurized white water and dividing it into a plurality of separate streams;
2. providing a plurality of sources of pressurized stock comprising liquid containing fibers;
3. introducing each source of stock into the separate streams of white water downstream of the single source thereof whereby the combined flows in each separate stream continue to flow downstream;
4. simultaneously separately screening each of the different streams of stock mixed with the white water in a screening means; and 5. conducting each of the separate streams of stock from its screening means to a web forming means to produce the multi-ply web.

4,021,296

METHOD AND DEVICE FOR MANUFACTURING A CONTINUOUS MATERIAL WEB OF ELONGATED FIBROUS PARTICLES

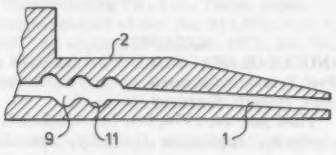
Per Lennart Reiner, Gustavsberg, Sweden, assignor to A. Ahlstrom Osakeyhtio, Noormarkku, Finland

Filed Nov. 7, 1974, Ser. No. 521,861

Claims priority, application Sweden, Nov. 23, 1973, 7315882

Int. Cl.² D21F *1/06*

U.S. Cl. 162—214 **21 Claims**



1. An improved method of manufacturing a continuous material web of elongated fibrous particles from a suspension of the fibrous particles with a concentration at least twice as high as the sediment concentration of the fibrous particles, in which the highly concentrated suspension is distributed and deflected in a chamber before the suspension is padded to a decay channel from which the suspension is deposited, the improvement comprising

passing the highly concentrated suspension through an intermediate forming channel having a substantially uniform channel height between the chamber and the outlet channel and causing said suspension to undergo a number of substantially equal angular changes of direction as the suspension passes a series of bends in the intermediate channel to change the direction of orientation amongst the fibres themselves which in turn causes local variations of the fibre concentration in the suspension to decrease.

9. An improved device for manufacturing a continuous material web of elongated fibrous particles outgoing from a suspension of the fibrous particles which has a concentration equal to at least twice the sediment concentration of the fibrous particles, and of the type having a chamber, in which the high concentration suspension is distributed and deflected and a decay channel wherefrom the suspension is deposited, the improvement comprising an intermediate forming channel between the chamber and the outlet channel and having generally uniformly spaced upper and lower walls which walls have mutually opposed substantially similar means for deflecting the suspension upwards and downwards through substantially equal angular changes of direction.

4,021,297

NUCLEAR REACTOR INSTALLATION CONTAINMENT CONSTRUCTION

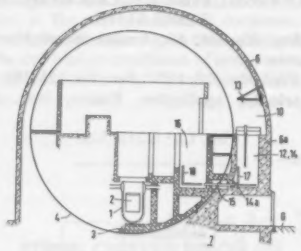
Robert Weber, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 21, 1973, Ser. No. 418,120

Claims priority, application Germany, Nov. 30, 1972, 2258741

Int. Cl.² G21C *19/00, 19/18*

U.S. Cl. 176—30 **2 Claims**



1. A water-cooled reactor installation comprising a spherical steel air-tight primary containment having a horizontal equator, an internal concrete construction enclosed by said containment and forming a supporting position for a reactor pressure vessel and a fuel-element handling basin horizontally offset from said position with said basin having a top level no higher than said equator, a concrete secondary air-tight containment enclosing said primary containment and having a vertical cylindrical wall extending downwardly from said equator, an external concrete construction below said equator and on the outside of said primary containment and supporting said primary containment and extending to the bottom of said wall and between said containments forming a fuel element storage pool substantially horizontally aligned with said basin and having a top level no higher than said equator, and a fuel-element lock extending transversely through said primary containment and interconnecting said pool and said basin at a level below their said top levels.

4,021,298

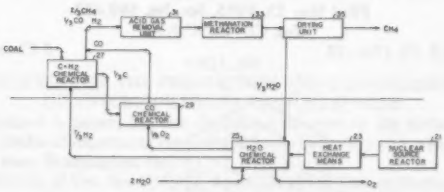
CONVERSION OF COAL INTO HYDROCARBONS

Andrew R. Jones, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1974, Ser. No. 437,575

Int. Cl.² G21C *15/00*

U.S. Cl. 176—39 **5 Claims**



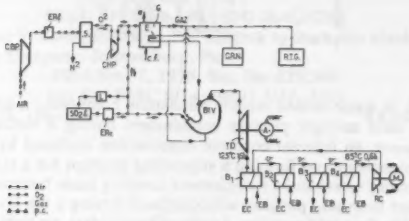
1. Apparatus for converting coal and water into at least one hydrocarbon including, a nuclear reactor for supplying energy for said apparatus, a first chemical reactor, reactive with the water, for converting water into hydrogen and oxygen, said first chemical reactor including means for separating said hydrogen and oxygen, means for supplying water to said chemical reactor, connecting means connecting said nuclear reactor to said chemical reactor for supplying energy to said chemical reactor to effect the conversion of said water into

hydrogen and oxygen, a second chemical reactor for reacting hydrogen and coal to convert hydrogen and coal into said hydrocarbon, means connected to said second chemical reactor for supplying said coal to said second chemical reactor, and means connected to said first chemical reactor for supplying the hydrogen converted by said first chemical reactor to said second chemical reactor to react with said coal.

4,021,299
METHOD OF WORKING A COMBINED NUCLEAR-FOSSIL FUEL CYCLE AND DEVICE FOR USING SAME

Georges Alfred Rigollot, 66, Avenue Henri Martin, 75116 Paris, France

Filed Nov. 20, 1974, Ser. No. 525,386
Claims priority, application France, Nov. 29, 1973, 73.42560
Int. Cl.² G21D 5/02
U.S. Cl. 176—39 9 Claims

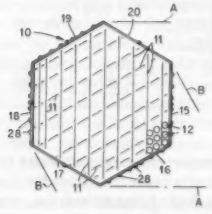


1. In a method of driving an alternator with steam generated by a nuclear reactor and heated by combustion of a fossil-fuel the improvement comprising introducing a fossil-fuel and substantially pure oxygen into a regenerator, passing steam generated by a nuclear reactor into said regenerator, effecting gasification of the fossil-fuel in said regenerator by formation of CO and H_2 and thereby increasing the heat potential of the steam therein, introducing the thus heated steam and the gasified fuel from said regenerator into a common burner and reacting said gasified fuel with oxygen therein, and passing the mixture of steam and combustion products from said burner to a turbine to drive same and an alternator drivably connected thereto.

4,021,300
IMPROVED NUCLEAR FUEL ASSEMBLY GRID SPACER

John Marshall, San Jose, and Samuel Kaplan, Los Gatos, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 23, 1975, Ser. No. 580,498
Int. Cl.² G21C 3/30
U.S. Cl. 176—78 9 Claims

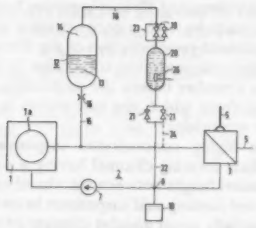


1. An assembly for retaining a plurality of fuel rods in spaced, substantially parallel array, comprising a tubular shaped longitudinally extending channel member, at least one thin-walled hexagonal shaped member positioned within said channel member, said hexagonal shaped member being composed of a plurality of flats, each of said flats being provided with a plurality of outwardly extending dimples defining at least a vertically extending row of dimples, and a plurality of vertically extending and horizontally extending slits, a pair of said horizontally extending slits being located in each of said flats to define a deflectable spring-like area therebetween, at least one pair of spaced layers of laterally spaced beams positioned in said hexagonal shaped member, each of said beams being configured to form waves therein, one layer of said laterally spaced beams extending from one flat to another flat of said hexagonal shaped member, another layer of said pair of laterally spaced beams extending from one flat to another flat of said hexagonal shaped member, said second-mentioned layer of laterally spaced beams being in a different plane in spaced apart relation to and extending at an angle with respect to said first-mentioned layer of laterally spaced beams, each of said beams being formed with an extending tab at each end, said extending tabs being bent at an angle with respect to said beams and secured to and flush with an inner surface of said adjacent flats.

4,021,301
NUCLEAR REACTOR INSTALLATION

Gerhard Frei, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 24, 1974, Ser. No. 436,145
Claims priority, application Germany, Jan. 31, 1973, 2304700
Int. Cl.² G21C 7/22
U.S. Cl. 176—37 5 Claims



1. A pressurized-water reactor installation comprising a reactor pressure vessel, a nuclear core inside of said vessel, a primary coolant pipe line loop connected to said vessel and including a steam generator and a main coolant pump, said vessel and said loop containing water coolant, a pressurizer outside of said vessel and comprising a chamber having a lower portion containing water and an upper portion containing steam, a pipe line connecting the pressurizer's lower portion with said loop and pressurizing the water in the loop, a tank on the outside of said vessel and containing a concentrated solution of core-reactivity control substance, means for connecting the upper portion of said pressurizer with said tank and pressurizing said solution, and means for connecting said tank with said loop in response to pressure in the loop abnormally reducing relative to pressure in the tank.

4,021,302

CELL CULTURES

Sidney Edwin Smith; Kevin Joseph O'Reilly, and John Prydie, all of London, England, assignors to Burroughs Wellcome & Co., Inc., Tuckahoe, N.Y.

Continuation of Ser. No. 318,234, Dec. 26, 1972, abandoned, which is a continuation of Ser. No. 31,802, April 24, 1970, abandoned, which is a division of Ser. No. 615,922, Feb. 14, 1967, Pat. No. 3,520,972. This application Aug. 20, 1975, Ser. No. 606,025

Claims priority, application United Kingdom, Feb. 18, 1966, 7258/66; Sept. 8, 1966, 40225/66

Int. Cl.² C12K 9/00

U.S. Cl. 195—1.8 1 Claim

1. A cell culture comprising a cell strain and a suitable nutrient medium therefor, wherein said cell strain is a feline embryo cell strain produced by disaggregating by chemical or mechanical means feline embryo tissue cells susceptible to feline infectious enteritis virus and serially passaging said cells up to at least the 20th passage level and at most the 48th passage level in a suitable nutrient media, said nutrient medium having a pH between 6.8–7.8 and a temperature in the range of 32° C to 39° C, so as to be cultured and sub-cultured, wherein said sub-culturing is facilitated by treating the confluent sheet of said cells with a chelating agent before each transfer into a new batch of suitable nutrient medium, said resultant cell strains remaining substantially diploid, typically fibroblastic, and substantially free from morphological transformations.

4,021,303

METHOD FOR TREATMENT OF MICROORGANISMS

Yutaka Nakabayashi, Fukuoka, Japan, assignor to Dai-Nippon Sugar Manufacturing Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 414,576, Nov. 9, 1973, abandoned. This application Dec. 30, 1975, Ser. No. 645,505

Claims priority, application Japan, Nov. 10, 1972, 47-112026; Nov. 10, 1972, 47-112027

Int. Cl.² A23J 3/00

U.S. Cl. 195—5 7 Claims

1. A method for treating a slurry of microorganisms which comprises

1. chemically treating the microorganisms for at least about 4 minutes with at least one alkali selected from the group consisting of sodium hydroxide and potassium hydroxide at a pH of from 10.5 to 12.9 and at a temperature of from 0° C to 30° C to form a mixture of chemically treated microorganism cells and waste liquid,
2. separating said microorganism cells from said waste liquid,
3. washing the separated microorganism cells with water to remove eluted nucleic acids or substances related thereto and lipids,
4. adding water to form a slurry of microorganism cells,
5. mechanically rupturing the cell membranes of the resulting chemically treated microorganisms using a three roll mill, or a sand grinder of the slit separation type at a pH of 7 to 10.2.

4,021,304

PROCESS FOR CONTINUOUS CULTIVATION OF PROTEIN-PRODUCING MICROORGANISMS

Hidenori Shimamatsu; Masaharu Yamada, both of Chiba; Toshio Tanaka, Ichihara, and Yahiko Suzuki, Ichikawa, all of Japan, assignors to Dainippon Sugar Manufacturing Co., Ltd. and Dainippon Ink and Chemicals, Incorporated, both of Tokyo, Japan

Filed May 16, 1974, Ser. No. 462,065

Claims priority, application Japan, Apr. 19, 1973, 48-43618

Int. Cl.² C12B 1/00

U.S. Cl. 195—28 R 3 Claims

1. In a process for the continuous cultivation of a single cell protein producing microorganism at a constant growth rate in a culture broth containing a carbon source selected from the group consisting of hydrocarbons, alcohols, carbohydrates, carbon dioxide and organic acids in which the pH of the culture broth is maintained at a constant valve by the addition of ammonia the improvement which comprises (1) maintaining the constant growth rate of said protein producing microorganism by adding ammonia at a constant rate and amount under steady state conditions of temperature, pressure, rate of aeration and amount of culture broth (2) measuring the rate of ammonia consumed at time intervals of from 10 to 120 minutes throughout the fermentation; thereby determining any variation in the rate of ammonia consumed at said selected time intervals and then upon determining said variation adjusting the cultivation conditions of temperature, pressure, rate of aeration and amount of culture broth back to said steady state.

4,021,305

STRING CULTURE INOCULUM

Robert D. Muir, Glenwood, Ill., and Vijay K. Sangar, Foster City, Calif., assignors to G. D. Searle & Co., Chicago, Ill.

Filed May 19, 1976, Ser. No. 687,724

Int. Cl.² C12B 1/02; C12K 3/00

U.S. Cl. 195—54 8 Claims

5. A string culture inoculum comprising a string having dried stabilized cells of one of

Salmonella typhimurium	ATCC 6994
Klebsiella pneumoniae	ATCC 10031
Enterobacter cloacae	ATCC 11367
Escherichia coli	ATCC 25922
Citrobacter freundii	ATCC 6750
Proteus vulgaris	ATCC 881
Pseudomonas aeruginosa	ATCC 15442
Shigella sonnei	ATCC 11060
Serratia marcescens	ATCC 14756
Staphylococcus aureus	ATCC 25923
Staphylococcus eipidermidis	ATCC 17917
Streptococcus faecalis	ATCC 10541 or
Streptococcus pyogenes	ATCC 12202

dispersed throughout, said string culture inoculum having a sufficient number of stabilized cells of said organism adhered thereto to produce at least 10^8 cells per milliliter upon incubation in 3 milliliters of trypticase soy broth at 37° C. for 2 hours.

4,021,306

PROCESS FOR THE PRODUCTION AND GERMINATION OF ENTOMOPHTHORA RESTING SPORES

Richard S. Soper, Jr., Orland, Maine, assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 681,962, April 30, 1976. This application Sept. 30, 1976, Ser. No. 728,105

Int. Cl.² C12B 1/00

U.S. Cl. 195—81 9 Claims

1. In a process for germinating resting spores wherein spores harvested from an inoculated media are put into an aqueous medium and then extracted, purified, dried and stored, the improvement comprising preconditioning the harvested spores prior to extracting and purifying them by adding to the spores in the aqueous medium 95% ethanol to make the aqueous medium approximately 1% ethanol and blending at approximately 10,000 to 14,000 rpm for 30 minutes.

4,021,307

METHOD AND APPARATUS FOR MEASURING TEMPERATURE CHANGES GENERATED BY ENZYME ACTIVITY

Klaus H. Mosbach, Furulund, Sweden, assignor to LKB-Produkter AB, Bromma, Sweden

Filed June 6, 1975, Ser. No. 584,595
Claims priority, application Sweden, June 7, 1974, 7407494
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.5 R 7 Claims

1. Method for measuring enzyme activities comprising the steps of:

a. providing a flow path for a fluid, a portion of said flow path being elongated and having a narrow transverse cross-section compared to the length thereof, said elongated portion being confined within a heat-isolated container;

b. introducing a matrix-bound enzyme preparation into said elongated portion of the flow path;

c. inserting heat-responsive sensor in intimate heat-exchanging relationship to said matrix-bound enzyme in said elongated flow path;

d. producing a flow of fluid containing a substrate which is affected by said enzyme through said flow path, and;

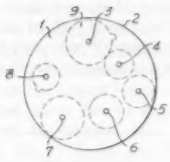
e. determining the enzyme activity solely by temperature changes sensed by said sensor.

4,021,308

APPARATUS ASSOCIATED WITH MAGNETICALLY RESPONSIVE, BIOLOGICALLY ACTIVE SUBSTANCE FOR TESTING THEREOF

Rolf Saxholm, Box 3, 1362 Billingstad, Norway

Division of Ser. No. 156,738, June 25, 1971, Pat. No. 3,843,450, which is a continuation-in-part of Ser. No. 705,539, Feb. 14, 1968, abandoned. This application Aug. 30, 1974, Ser. No. 502,108
Claims priority, application Norway, Feb. 16, 1967, 67166874
Int. Cl.² C12K *1/00*
U.S. Cl. 195—127 12 Claims



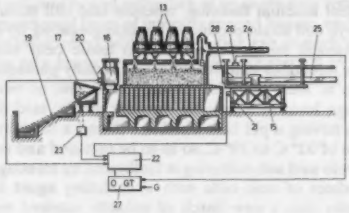
1. Apparatus for testing reactions comprising support means for a substrate capable of containing an agent, dispenser means for depositing a plurality of articles adapted for containing respective active constituents onto said substrate in said support means in spaced relation, the reactivity of said constituents with the agent of said substrate being determined by the production of detectable results, index means for orienting the dispenser means and said support means relative to one another to predetermine the locations of said articles on the substrate in said support means, and reader means correlated with said index means for determining said detectable results at said predetermined locations, said reader means including a first means for producing a first electrical signal for each article for indicating the magnitude of the result, a second means for producing a second electrical signal indicative of the identity of the article being examined and a third means for correlating said first and second signals for each particular article.

4,021,309

AUTOMATIC COKE OVEN PLANT WITH MEANS TO INSURE SUFFICIENT COKING

Herman Radstake, Uitgeest; Gerrit De Jong, Velsen-Noord, and Josephus Hendrikus Maria van der Velden, Aerdenhout, all of Netherlands, assignors to Hoogovens Ijmuiden B.V., Ijmuiden, Netherlands

Continuation of Ser. No. 365,283, May 30, 1973, abandoned. This application Oct. 21, 1974, Ser. No. 516,493
Claims priority, application Netherlands, May 30, 1972, 7207307
Int. Cl.² C01B *35/00*, *47/00*
U.S. Cl. 202—227 4 Claims



1. In a coke oven plant for automatically producing coke from coal by a dry distillation operation including a number of coke oven batteries in a row which have alternating coking chambers and heating chambers, a coal supply means, coal charging means, a pushing machine, a door machine, a quenching car, a quenching tower, and a quenching slope, the improvement comprising first signal means operatively associated with the pushing machine for generating a signal upon movement of the pushing machine, door control means operatively associated with the door machine, second signal means operatively associated with the door control means for generating a signal to actuate the door control means for controlling the movement of the door machine to automatically lock the door, quenching car control means for controlling the movement of the quenching car, third signal means operatively associated with the car control means for generating a signal to actuate the car control means for controlling the movement of the quenching car, computer means connected in circuitry with the first signal means generated by movement of the pushing machine, the second signal means for actuating the door control means, and the third signal means for actuating the quenching car control means, and means for feeding predetermined minimum and maximum coking time valves as in-put signals to the computer means, said minimum and maximum coking time values being determined on the basis of the composition of the coal, the density thereof, and the quantity of heat to be supplied to the heating chamber, said door control means and quenching car control means being responsive to computer generated output signals for controlling the actuation of the door machine and the movement of the quenching car to insure that the coal will be sufficiently coked.

4,021,310

METHOD FOR INHIBITING THE POLYMERIZATION OF ACRYLIC ACID OR ITS ESTERS

Noboru Shimizu, Takatsuki; Sadao Yoshida, Suita; Kunihiro Kubota, Takatsuki, and Takashi Ohara, Nishinomiya, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 426,037, Dec. 19, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,263
Int. Cl.² B01D *3/34*; C07C *57/04*
U.S. Cl. 203—8 2 Claims

1. A method for inhibiting the polymerization of a member selected from the group consisting of acrylic acid and acrylic

acid esters during a distillation process for separating the acrylic acid or the acrylic acid esters derived from said acrylic acid obtained by the vapor phase catalytic oxidation of a member selected from the group consisting of propylene, acrolein, and the acrylic esters derived from said acrylic acid, said method comprising distilling one of said members selected from the group consisting of acrylic acid and acrylic esters in the presence of (A) 10 – 5000 ppm, based on the weight of the vapor rising in the distillation zone, of at least one compound selected from the group consisting of hydroquinone, hydroquinonemonomethyl ether, cresol, phenol, t-butyl catechol, diphenylamine, phenothiazines and methylene blue; (B) 5 – 2000 ppm, based on the weight of the vapor rising in the distillation zone, of at least one compound selected from the group consisting of copper dimethyldithiocarbamate, copper diethyldithiocarbamate, copper dibutyldithiocarbamate and copper salicylate; and (C) 0.01 – 5%, based on the volume of the vapor rising in the distillation zone, of molecular oxygen and then recovering the purified acrylic acid or acrylic esters.

4,021,311

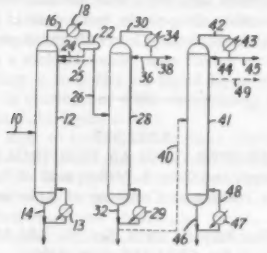
RECOVERY OF ALKYLENE GLYCOLS BY AZEOTROPIC DISTILLATION WITH 1,2,3-TRIMETHYL BENZENE

Mitchell Becker, Teaneck, N.J., assignor to Halcon International, Inc., New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,826

Int. Cl.² B01D *3/36;* **C07C** *29/24*

U.S. Cl. 203—69 **4 Claims**



1. A process for recovering ethylene glycol or propylene glycol characterized by an ultraviolet absorbance below 0.15 when measured at 220 nanometers and below 0.05 at wavelengths beyond 240 nanometers from a mixture comprising ethylene glycol or propylene glycol in admixture with at least one mono-lower carboxylate ester and at least one di-lower carboxylate ester of said ethylene glycol or propylene glycol which comprises the steps of:

a. subjecting said mixture to distillation in a distillation zone in the presence of 1,2,3-trimethylbenzene as an azeotroping agent whereby an overhead product and a bottoms product are produced, said overhead product comprising an azeotrope of said azeotroping agent and said glycol and said bottoms product comprising at least some of the ester in said mixture substantially reduced in glycol content;

b. separating said overhead product into a first phase comprising said azeotroping agent and a second phase comprising said glycol;

c. returning said first phase to said distillation zone as reflux, and

d. recovering purified glycol characterized by an ultraviolet absorbance below 0.15 when measured at 220 nanometers and below 0.5 at wavelengths beyond 240 nanometers from at least part of the second phase.

4,021,312

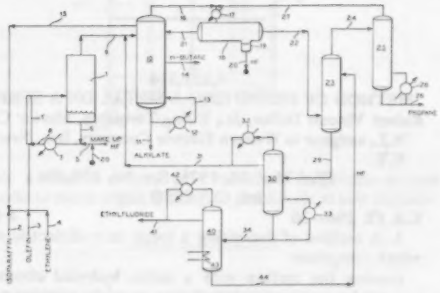
PROCESS TO SEPARATE ETHYL FLUORIDE AND HF

Cecil O. Carter, Wann, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 622,592, Oct. 15, 1975, Pat. No. 3,988,355. This application June 24, 1976, Ser. No. 699,549

Int. Cl.² B01D *3/14;* **C07C** *19/08*

U.S. Cl. 203—80 **4 Claims**



1. A process for separating a stream consisting essentially of HF, ethyl fluoride and isoparaffin, which process comprises

a. fractionally distilling said stream in a first column under a pressure in the range of about 150 to 300 psig, thereby forming an overhead stream consisting essentially of isoparaffin and a liquid bottoms stream consisting essentially of HF and ethyl fluoride, and

b. fractionally distilling said liquid bottoms stream in a second column under a pressure in the range of about 50 to 145 psig to form an overhead stream consisting essentially of ethyl fluoride and a bottoms stream consisting essentially of HF.

4,021,313

METHOD FOR PURIFYING ACTINIDES WHICH ARE IN LOW OXIDATION STATES

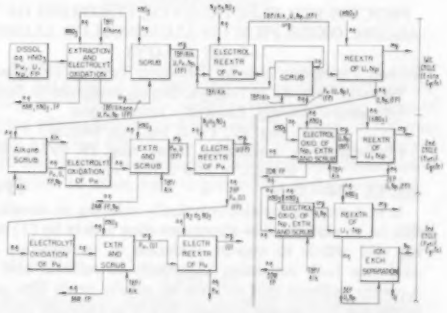
Helmut Hausberger, Bad Schonborn; Hubert Goldacker, and Helmut Schmieder, both of Karlsruhe, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Oct. 20, 1975, Ser. No. 624,106

Claims priority, application Germany, Oct. 19, 1974, 2449590

Int. Cl.² C25C *3/34*

U.S. Cl. 204—1.5 **17 Claims**



1. A method for purifying plutonium present in a low oxidation of Pu(III) in an aqueous solution containing fission products by extracting the plutonium from the aqueous solution and confining the fission products to the aqueous solution comprising: subjecting an aqueous nitric acid solution containing the Pu(III), hydrazine nitrate or hydroxyl ammonium nitrate, and fission products to an electrolysis voltage below

the voltage at which oxygen develops at the anode to anodically oxidize the Pu(III) to Pu(IV),

transferring the Pu(IV) which was formed by aniodic oxidation from the aqueous solution to an organic phase by means of an organic extraction agent separating the organic phase from the aqueous phase, and then using the separated organic phase in a plutonium recovery process.

4,021,314

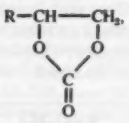
METHOD OF DEPOSITING A METAL ON A SURFACE

Robert Vincent Dafter, Jr., Ewing Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,496
Int. Cl.² C25D 5/56
U.S. Cl. 204—30 4 Claims

1. A method of depositing a metal on a dielectric surface which comprises:

treating the surface with a stable hydrosol obtained by mixing and heating together in an acidic aqueous medium (1) a salt of a noble metal with (2) an organic compound containing at least two oxygen atoms selected from the group consisting of (a) an organic carbonate having a structural formula of



where R is a member selected from the group consisting of an alkyl radical and a hydrogen atom, (b) ethylene glycol, and (c) 1,3 dioxane; and

exposing said treated surface to a suitable electroless metal deposition solution to catalytically deposit an electroless metal deposit thereon.

4,021,315

PROCESS FOR ELECTROLYTIC COLORING OF THE ANODIC OXIDE FILM ON ALUMINUM OR ALUMINUM BASE ALLOYS

Kiyomi Yanagida; Tadashi Hirokane; Tadashi Tsukiyasu, and Tomoari Sato, all of Nagoya, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 27, 1975, Ser. No. 608,307
Claims priority, application Japan, Aug. 29, 1974, 49-99682
Int. Cl.² C25D 11/06, 11/08
U.S. Cl. 204—35 N 13 Claims

1. In a process for electrolytically coloring an anodic oxide film on an aluminum or aluminum alloy article by (1) subjecting said article to anodic oxidation in an aqueous anodic oxidation bath consisting essentially of sulfuric acid or an aromatic sulfonic acid to form an anodic oxide film; and (2) subjecting said anodic oxidized article to cathodic electrolytic coloring using a direct current in an aqueous, electrolytic coloring bath containing a water-soluble metallic salt; the improvement which comprises subjecting said anodic oxidized article to anodic electrolysis using a direct current in an aqueous anodic electrolysis bath containing the same metal ion as in the coloring bath but having no ability to form an oxide film on said article, after step (1) above but prior to said electrolytic coloring step (2) above.

4,021,316

BATH FOR THE ELECTRODEPOSITION OF BRIGHT TIN-COBALT

Shimetomo Fueki, Tokyo; Junichi Tada, Yokohama; Kenji Osawa, Hino; Naomi Sakai, and Kazuhiro Ogawa, both of Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 360,542, May 15, 1973, Pat. No. 3,914,160. This application Aug. 21, 1975, Ser. No. 606,597
Claims priority, application Japan, May 17, 1972, 47-48181
Int. Cl.² C25D 3/60
U.S. Cl. 204—43 S 11 Claims

1. A bath for bright tin-cobalt alloy electroplating consisting essentially of an aqueous alkaline solution of:

a. a stannous salt present in an amount sufficient to provide approximately from 2 to 70 grams of tin metal per liter of said solution,

b. a cobalt salt present in an amount sufficient to provide approximately from 1 to 40 grams of cobalt metal per liter of said solution, with the total amount of said tin and cobalt metals being less than 75 grams per liter of said solution,

c. an alkali metal pyrophosphate present in an amount more than twice the molar amount of said total amount of said tin and cobalt metals but not more than 2 mols per liter of said solution, and

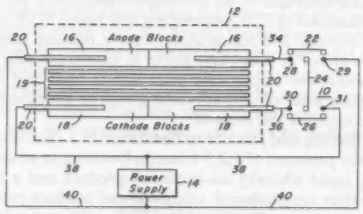
d. a brightener additive consisting of at least one water-soluble peptide and at least one substance selected from the group consisting of ammonia, ammonium salts and amine compounds, said water-soluble peptide being present in an amount of approximately from 0.1 to 80 grams per liter of said solution, and said substance, when selected to be ammonia, being present in an amount of approximately 5 to 25 grams, calculated as ammonia gas, per liter of said solution, and, when selected from said ammonium salts and amine compounds, being present in an amount of approximately from 0.1 to 150 grams per liter of said solution.

4,021,317

METHOD OF OPERATING AN ELECTROLYTIC CELL

Lester L. Knapp, and Gene S. Miller, both of Palestine, Tex., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed May 10, 1976, Ser. No. 684,837
Int. Cl.² C25C 3/06, 3/00
U.S. Cl. 204—67 7 Claims



1. A method of changing the operation of an electrolytic cell having at least one anode and one cathode, with a source of electrical current ordinarily directly connected to the anode and to the cathode at two, spaced apart locations on the anode and cathode for electrolytic operation, the method comprising the steps of

disconnecting one of the locations on the anode and cathode from the source of electrical current,

connecting the disconnected locations of the anode and cathode directly together so that the path of current flow

to and from the source of electrical current is limited to serial flow through the anode and cathode, and

utilizing the electrical resistance of the anode and cathode to the flow of electrical current therethrough to heat the cell.

4,021,318

PROCESS FOR PRODUCING ALUMINUM

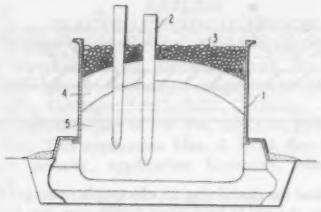
Kimio Yano; Tadaaki Nagai; Koji Matsumoto; Motokiyo Nagayasu, and Junichi Tanaka, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 10, 1975, Ser. No. 639,509

Claims priority, application Japan, Dec. 10, 1974, 49-142359

Int. Cl.² C25C *3/06*

U.S. Cl. 204—67 **8 Claims**



1. A process for producing aluminum by electrolyzing aluminum oxide dissolved in a molten salt bath in an electrolytic cell having a Soderberg anode with vertical contact studs which is periodically removed from an anode paste, characterized in that a molded anode paste having a composition that does not form a soup-like or liquid layer is used, and the electrolysis is carried out while maintaining the anode such that it forms three layers in situ:

an upper layer of molded anode paste exerting a load of at least about 5 g/cm² gauge per unit area of the surface of an unbaked interlayer thereunder and has a surface temperature of not more than about 130° C;

an unbaked interlayer thereunder which, for some time after removal of the contact studs from the anode does not clog the holes left by pulling out the studs; and

a lower baked layer, said unbaked interlayer and said lower baked layer being the product of differentially heating the anode paste to an extent determined by a temperature condition produced in the cell by the vertical contact studs and the molten salt bath.

4,021,319

ELECTROLYTIC PROCESS FOR RECOVERY OF SILVER FROM PHOTOGRAPHIC FIXER SOLUTION

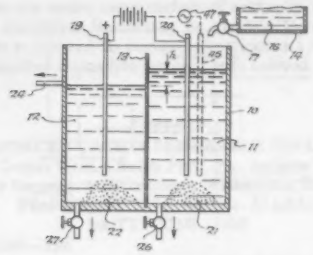
Karl Moeglich, Williamsville, N.Y., assignor to Silrec Systems, Inc., Williamsville, N.Y.

Continuation of Ser. No. 550,477, Feb. 18, 1975, abandoned. This application Sept. 24, 1975, Ser. No. 616,121

Int. Cl.² C25B *1/00*

U.S. Cl. 204—96 **41 Claims**

1. A method of electrolytically removing silver from a photographic fixer solution comprising the steps of placing said photographic fixer solution in a cell having an anode chamber containing an anode and a cathode chamber containing a cathode with said chambers being created by a diaphragm having a pore size of a proper magnitude which will aid in creating a caustic condition in the cathode compartment, and applying a direct current across said anode and cathode to



create a current density of a sufficient magnitude at said cathode to cause argentic oxide to precipitate at said cathode.

4,021,320

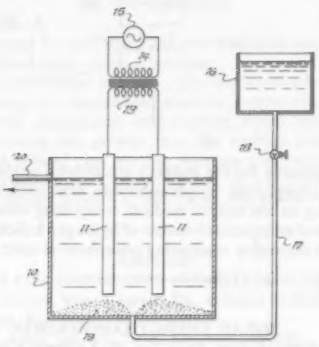
ELECTROCHEMICAL PROCESS UTILIZING ALTERNATING CURRENT FOR RECOVERY OF SILVER FROM PHOTOGRAPHIC FIXER SOLUTION AND OTHER SOLUTIONS CONTAINING SILVER IONS

Karl Moeglich, Williamsville, N.Y., assignor to Silrec Systems, Inc., Williamsville, N.Y.

Continuation of Ser. No. 550,454, Feb. 18, 1975, abandoned. This application Sept. 24, 1975, Ser. No. 616,402

Int. Cl.² C25B *1/00*

U.S. Cl. 204—96 **33 Claims**



1. A method of electrochemically removing silver in the form of AgO from a photographic fixer solution without destroying the utility of the solution comprising the steps of applying alternating current having a frequency of between about 0.5 Hz and 800 Hz and a density of between about 0.1 and 20 amperes per square inch across electrodes immersed in said solution to cause AgO to precipitate at the electrodes.

4,021,321

ELECTROLYTIC PREPARATION OF PHOSPHOROUS ACID FROM ELEMENTAL PHOSPHORUS

Donald A. White, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

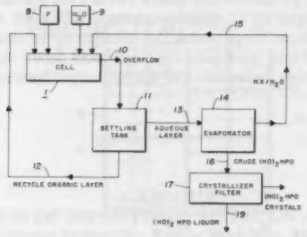
Filed Dec. 15, 1975, Ser. No. 640,671

Int. Cl.² C25B *1/22*

U.S. Cl. 204—103 **26 Claims**

1. An improved process for the indirect electrolytic oxidation of elemental phosphorus to phosphorous acid which

comprises subjecting an electrolysis medium containing elemental phosphorus, an aqueous solution of hydrogen halide,



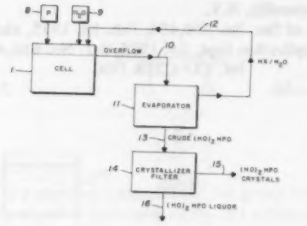
and a nonaqueous solvent to electrolysis, and thereafter recovering phosphorous acid.

4,021,322

ELECTROLYTIC PREPARATION OF PHOSPHORUS ACID FROM ELEMENTAL PHOSPHORUS

Michael J. Dolan, Manchester, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 15, 1975, Ser. No. 640,506
Int. Cl.² C25B *1/22*
U.S. Cl. 204—103 **12 Claims**



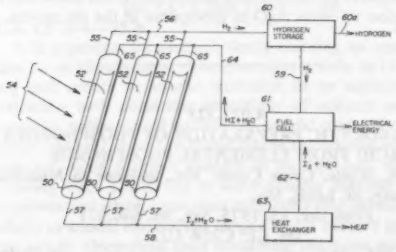
1. A process for the indirect electrolytic oxidation of elemental phosphorus to phosphorous acid which comprises subjecting an electrolysis medium comprising elemental phosphorus and an aqueous solution of hydrogen halide to electrolysis, and thereafter recovering phosphorous acid.

4,021,323

SOLAR ENERGY CONVERSION

Jack S. Kilby, Dallas, Tex.; Jay W. Lathrop, Clemson, S.C., and Wilbur A. Porter, College Station, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex., a part interest

Filed July 28, 1975, Ser. No. 599,473
Int. Cl.² C25B *1/02*; H01L *31/06*; C25B *5/00*
U.S. Cl. 204—129 **9 Claims**



1. An energy converter which comprises:

a. a plurality of photovoltaic generators,
b. an electrolyte in physical contact with said generators, and
c. means for exposing said generators to light, causing an electric potential to be developed by said generators which will cause current flow through said electrolyte to produce an electro chemical reaction in said electrolyte.

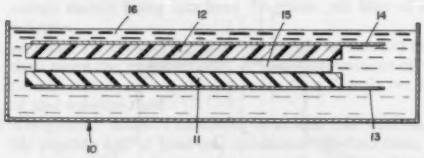
2. The combination set forth in claim 1 wherein said generators comprise semiconductor junctions formed between semiconductors of opposite conductivity type.

4,021,324

METHOD FOR ELECTROPHORETIC DESTAINING

Timothy Edwin Delony, Oakland; James R. Gangwer, Alameda, and James F. Monthony, Albany, all of Calif., assignors to Bio-Rad Laboratories, Inc., Richmond, Calif.

Filed Sept. 8, 1975, Ser. No. 610,941
Int. Cl.² G01N *27/26*, *27/30*
U.S. Cl. 204—180 G **4 Claims**



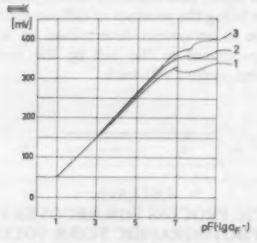
1. A method for destaining an electrophoretic gel comprising: disposing the gel to be destained between two beds of ion exchange resin, and applying an electrical potential across said resin beds to cause sufficient current to flow from one of said resin beds through said gel to move unbound stain out of said gel, and into the other resin bed.

4,021,325

SELECTIVE FLUORIDE-SENSITIVE ELECTRODE

Ernö Pungor; Elek Doktor; Márton Patkó; Jenö Havas, and Lajos Kecskés, all of Budapest, Hungary, assignors to Elektrokemiai Muszergyarto Szov., Budapest, Hungary

Filed July 7, 1975, Ser. No. 593,567
Claims priority, application Hungary, Oct. 31, 1974, RA-623
Int. Cl.² G01N *27/30*, *27/50*
U.S. Cl. 204—195 M **3 Claims**



1. Selective fluoride-sensitive electrodes for the determination of fluoride ion concentrations and activities in solutions having a solid sensor built up of fluoride precipitates and an electrode body built up in such a manner that one surface portion of the sensor contacts the sample solution whereas an other surface portion of the sensor, isolated by an electrode body from the portion in contact with the sample, contacts an electrolyte solution of constant ion concentration, comprising a sensor in the form of a solid block (4), the surface portion of block (4), contacting the sample solution, being spherical or

of a curved surface void of edges or spices; the surface of block (4) not contacting the sample solution or the solution of constant ion concentration (8) being connected to an elastic layer (5), which fits into the wall portion parallel to the surface at sensor block (4), of outer (6) and inner (7) tubular plastic electrode bodies, the material of the block being prepared from fluorides of a lanthanide mixture composed of the lanthanide series of rare earth metals.

3. A process for the preparation of a selective fluoride-sensitive electrode described in claim 1 capable of the determination of the concentration and/or activity of fluoride ions in liquids comprising mechanical polishing and thereafter isothermal recrystallization of the surface of a block (4) covering the surface portion of said block (4) not in contact with the sample solution and the solution of constant ion concentration with an elastic layer (5), mechanically securing the rubber-covered surface portions to the wall of a tubular electrode bodies (6,7) made of plastic, filling the tubular electrode bodies (6,7) with an electrolyte solution (8) and placing a potential outlet terminal (9) into said electrolyte solution.

4,021,326
ELECTRO-CHEMICAL SENSOR

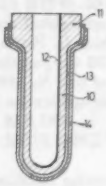
Rudolf Pollner, Kornwestheim; Karl-Hermann Friese, Leonberg; Bernhard Topp, Gerlingen, and Horst Neidhard, Korntal, all of Germany, assignors to Robert Bosch G.m.b.H., Gerlingen-Schillerhohe, Germany

Continuation-in-part of Ser. No. 259,134, June 2, 1972, abandoned. This application Mar. 4, 1974, Ser. No. 447,475

Claims priority, application Germany, Mar. 7, 1973, 2311165

Int. Cl.² G01N *27/46*

U.S. Cl. 204—195 S **26 Claims**



1. Electro-chemical sensor to determine oxygen concentration in hot internal combustion exhaust gases comprising

a closed, tubular element comprising a solid oxygen ion conductive electrolyte which includes a first tubular portion having a closed end and adapted to be exposed to the exhaust gases, and a second connecting tubular portion integral with said first tubular portion for providing an electrical connection to said first tubular portion, said connecting portion having an outwardly extending flange therearound;

an electron-conductive layer on the inner surface of said solid electrolyte of at least a part of said first tubular portion;

and outer electron conductive layer on at least a part of the outer surface of said solid electrolyte of said first tubular portion, said outer conductive layer being of a material which catalyzes the formation from said hot exhaust gases of those compounds that are thermodynamically stable at the exhaust gas temperature, said outer conductive layer having pores or fissures which are of a diameter, or width, not greater than about the thickness of said outer conductive layer;

a porous protective electrically insulating coating covering said outer electron-conductive layer; and

an electrically insulating coating covering at least all of the outer surface portions of said solid ion conductive electrolyte of said first tubular portion not covered by said outer conductive layer, and including the outer surface of said tubular element extending up to said flange and covering a portion thereof and all of the outer surface of said solid ion conductive electrolyte of said connecting portion up to and at least adjacent said connecting flange;

whereby the entire outer surface of said solid ion conductive electrolyte which may be exposed to said exhaust gases is covered to prevent direct contact of solid ion conductive electrolyte material with exhaust gases.

4,021,327
REINFORCED CATION PERMEABLE SEPARATOR

Walther Gustav Grot, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 29, 1975, Ser. No. 572,832

Int. Cl.² C25B *13/08*

U.S. Cl. 204—296 **19 Claims**

1. A cation permeable separator substantially impervious to hydraulic flow of liquid comprising a fluorine-containing polymer with a plurality of sulfonyl groups present as ion exchange sites,

said sulfonyl groups being contained in side chains and being attached to individual carbon atoms to which are attached at least one fluorine atom,

said separator containing support fibers and containing voids which are formed by the removal of sacrificial fibers, said supporting fibers and sacrificial fibers initially comprising a fabric prior to formation of said voids.

4,021,328
SOLIDFYING SOLVENT REFINED COAL

Ronald H. Wolk, San Jose, Calif., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Mar. 19, 1976, Ser. No. 668,772

Int. Cl.² C10G *1/00*

U.S. Cl. 208—8 **4 Claims**

1. A method for solidifying the non-distillable residue from solvent refined coal, which comprises:

spraying said residue into an immiscible liquid selected from the group and oxygenated aromatic compounds and heterocyclic compounds hydrocarbon liquid boiling at a temperature not greater than the melting point of the solvent refined coal residue, wherein said residue is at a temperature of at least 500° F and the particles from the spray rapidly solidify to non-tacky non-porous particles.

4,021,329
PROCESS FOR DISSOLVING SUB-BITUMINOUS COAL

Walter H. Seitzer, West Chester, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Filed Jan. 15, 1976, Ser. No. 649,297

Int. Cl.² C10G *1/08*

U.S. Cl. 208—10 **6 Claims**

1. A process for dissolving sub-bituminous coal comprising heating said coal in the presence of a hydrogen donor oil, gaseous carbon monoxide, water, hydrogen, and an iron compound promoted with an alkali or alkali precursor at a temperature of from about 400° to about 425° C and at a total pressure of from about 2000 to about 5000 psig.

4,021,330
HYDROTREATING A HIGH SULFUR, AROMATIC LIQUID HYDROCARBON

Donald P. Satchell, Jr., Morenci, Ariz., assignor to Continental Oil Company, Ponca City, Okla.

Filed Sept. 8, 1975, Ser. No. 611,275

Int. Cl.² C10G *23/02*

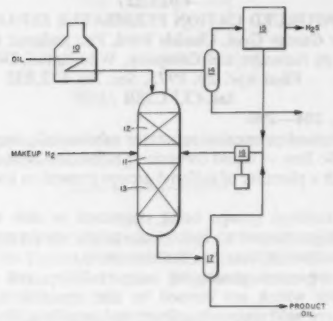
U.S. Cl. 208—89 **9 Claims**

1. A method of hydrotreating a high sulfur, aromatic liquid hydrocarbon feedstock comprising:

a. introducing said feedstock into the upper portion of a reactor for downward flow therethrough, said reactor

having a first sulfur-resistant catalyst bed in the upper portion thereof and a second sulfur-sensitive catalyst bed in the lower portion thereof;

b. introducing hydrogen to the reactor at a point between the two catalyst beds, the hydrogen flowing countercurrent to the feedstock through the first catalyst bed and cocurrent with the feedstock through the second catalyst bed;



c. recovering said hydrogen that passes overhead through said first catalyst bed and said hydrogen that passes downwardly through said second catalyst bed and recycling at least a portion of the hydrogen to step (b); and

d. recovering hydrotreated product from the bottom of said reactor.

4,021,331

ORGANIC COMPOUND CONVERSION BY ZEOLITE ZSM-20 CATALYSTS

Julius Ciric, Pitman, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 526,883, Nov. 25, 1974, Pat. No. 3,972,983. This application May 25, 1976, Ser. No. 689,719

Int. Cl.² C10G *13/04*; B01J *29/28*

U.S. Cl. 208—111 **19 Claims**

1. A process for effecting catalytic conversion of an organic compound charge which comprises contacting said charge over catalytic conversion conditions with a catalyst comprising a synthetic crystalline aluminosilicate zeolite having a composition expressed in terms of mole ratios of oxides in the anhydrous state as follows:

$$(0.3\text{–}0.6)R_2O: (0.4\text{–}0.7)M_2O: Al_2O_3: (x)SiO_2$$

wherein R is a tetraethylammonium cation, M is an alkali metal cation and x is at least 7, and having an X-ray powder diffraction pattern which shows the significant lines set forth in Table 1 of the specification or the thermally treated product thereof.

4,021,332

HYDROCARBON CONVERSION OVER ACTIVATED ERIONITE

Robert C. Wilson, Jr., Woodbury, N.J., and Albert B. Schwartz, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed June 12, 1975, Ser. No. 586,130

Int. Cl.² C10G *11/02*, *11/04*; B01J *29/06*

U.S. Cl. 208—120 **12 Claims**

1. A process for the shape selective conversion of straight-chain hydrocarbons in a hydrocarbon mixture comprising contacting the hydrocarbon mixture under hydrocarbon conversion conditions with a crystalline aluminosilicate erionite which has been prepared by the steps comprising (1) calcining erionite in a gas having a low pressure of water at from about 900° F to about 1500° F, (2) contacting at least once with ammonium ions, (3) contacting with cations of a polyvalent metal, (4) calcining as set forth in (1), (5) contacting with ammonium ions, (6) contacting with nickel cations and (7) calcining in a gas as defined in (1) at from about 800° F to about 1400° F.

4,021,333

METHOD OF REREFINING OIL BY DISTILLATION AND EXTRACTION

Emile Najib Habiby, Willowick, and Richard William Jahnke, Mentor-on-the-Lake, both of Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio

Filed Aug. 27, 1975, Ser. No. 608,317

Int. Cl.² C10M *11/00*

U.S. Cl. 208—179 **15 Claims**

1. A method of recovering oil of lubricating viscosity from used oil which comprises the steps of:

A. Distilling said used oil to remove therefrom a forecut having a viscosity substantially less than that of lubricating oil and a flash point (Tag or Pensky-Martens method) less than 121° C.;

B. Continuing the distillation to recover a distillate having substantially the viscosity of lubricating oil;

C. Extracting impurities from the distillate of step B with an organic liquid extractant which is substantially immiscible with said distillate; and

D. Removing said organic liquid and impurities dissolved therein from said distillate.

4,021,334

PROCESS FOR MANUFACTURE OF STABILIZED LUBRICATING OIL WITH ELEMENTAL SULFUR

Robert L. Gorring, Washington Crossing, Pa.; Eric J. Y. Scott, Princeton, and Robert L. Smith, Hopewell, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 495,591, Aug. 8, 1974, Pat. No. 3,972,853. This application June 8, 1976, Ser. No. 693,828

Int. Cl.² C10G *23/02*; C10M *1/08*

U.S. Cl. 208—211 **12 Claims**

1. A process for forming stabilized lubricating oil resistant to oxidation and sludge formation upon exposure to an oxidative environment which comprises the steps of (1) contacting a hydrocarbon lubricating oil stock with elemental sulfur in amount of from about 0.05 to about 1.0 percent by weight of said oil stock at a temperature of between about 25° and about 130° C and pressure of from about 0 psig to about 100 psig for a contact time of from about 0.1 hour to about 10 hours, and (2) contacting the oil product from step (1) with hydrogen and with alumina impregnated with at least about 10 weight percent MoO_3 and at least about 2.5 weight percent CoO, said impregnated alumina having at least 50 percent of the pores thereof in a pore diameter of 50 Angstrom units or more, at a temperature of from about 80° to about 190° C, a pressure of from about 100 psig to about 300 psig, a hydrogen circulation rate of from about 100 scf/bbl to about 1500 scf/bbl and a liquid hourly space velocity of from about 0.1 hr^{-1} to about 10 hr^{-1}

4,021,335

METHOD FOR UPGRADING BLACK OILS

William Ingram Beaton, Wheaton, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed June 17, 1975, Ser. No. 587,631

Int. Cl.² C10G *21/14*

U.S. Cl. 208—309 **11 Claims**

1. In a process for treating a heavy hydrocarbon fraction containing ash, asphaltenic, metallic, and sulfurous contaminants by contacting said heavy hydrocarbon fraction with a liquid paraffinic solvent at an elevated temperature below the critical temperature of said solvent and under a pressure

sufficiently high to maintain said solvent in the liquid phase, to form a flocculated asphaltene phase and a deasphalted oil phase having a substantially reduced content of said contaminants than that in the heavy hydrocarbon fraction, the improvement comprising:

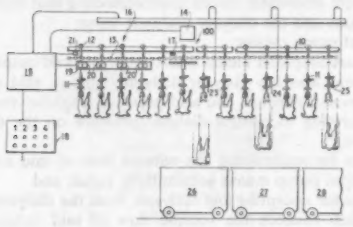
a. contacting said heavy hydrocarbon fraction with a liquid paraffinic solvent containing from about 3 to about 9 carbon atoms per molecule, in the presence of a nonionic polymeric polyester organic demulsifying agent and from about 1 to about 40% by weight of added water based on the weight of said heavy hydrocarbon fraction, and at a temperature from about 70° to about 400° F., wherein the ratio of said heavy hydrocarbon fraction to said solvent is from about 1:2 to about 1:5 by weight, and wherein the amount of said demulsifying agent is from about 1 to about 200 quarts per 1000 barrels of said heavy hydrocarbon fraction and

b. separating said flocculated asphaltene phase from the deasphalted oil phase.

4,021,336
GRADING APPARATUS

Richard Morley Brook, and Eric Elliot, both of Huddersfield, England, assignors to AutoSystems Limited, Huddersfield, England

Filed Jan. 28, 1976, Ser. No. 652,960
Int. Cl.² B65G *47/34*; B07C *5/16*
U.S. Cl. 209—74 M **16 Claims**



10. A system for transporting and sorting poultry carcasses comprising an overhead conveyor system, a control unit, a grading station, means for feeding information into the control unit regarding the grade of carcass at the grading station, means for storing the information in the control unit, a weighing station, means for feeding into the control unit information regarding the weight of carcasses as they pass through the weighing station, and a plurality of shift registers each associated with a drop-off mechanism, one of which receives a signal relating to one particular carcass, dependent on the grading information and weight information received by the control unit, and actuates the associated drop-off mechanism to remove the particular carcass from the conveyor when the particular carcass reaches the drop-off mechanism.

4,021,337
SIEVE WITH DRIVE

Peter Wehren, Bensberg-Refrath, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Sept. 2, 1975, Ser. No. 609,411
Claims priority, application Germany, Sept. 11, 1974, 2443370
Int. Cl.² B07B *1/34*
U.S. Cl. 209—329 **11 Claims**

1. In a vibratory sieve construction, the combination comprising:

a substantially horizontal sieve member for receiving material on its upper surface to be screened;

first and second longitudinal sidewalls extending along the sieve member located adjacent the sides of an area of the sieve member with the walls in vibration transmitting support relative to the sieve member;

an intermediate longitudinal wall between said sidewalls in vibration transmitting support relation to the sieve member;

first and second vibratory drives connected to the sidewalls having a vibratory force output for applying said force to the sidewalls;

an intermediate vibratory drive connected to the intermediate wall having a vibratory force output substantially twice the force output of each of said first and second drives;

means for interconnecting said first and second drives with said intermediate drive for direct operation in synchronism;

and motor means for applying an operating force to said drives.

4,021,338
METHOD FOR TREATING SEPTIC TANK EFFLUENT SEEPAGE BEDS AND THE LIKE

John M. Harkin, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of Ser. No. 602,764, Aug. 7, 1976. This application Nov. 8, 1976, Ser. No. 739,979
Int. Cl.² E02B *11/00*; C02B *1/34, 3/08*
U.S. Cl. 210—63 R **3 Claims**

3. A method of treating the clogged or crusted and ponded effluent seepage bed of a septic system containing in combination a septic tank with an effluent exit port, and effluent distribution box or manifold, effluent distribution lines emanating from said box or manifold and an effluent seepage bed associated with said distribution lines, which method consists of, pumping said septic tank to lower the liquid level in said tank substantially below the effluent exist port, substantially reducing the volume of water ponded in said seepage bed and treating said seepage bed with hydrogen peroxide in an amount sufficient to increase the permeability thereof and thereby its functionality.

4,021,339
WATER FILTER

Patrick Foody, 280 Main Road, Hudson, Quebec, Canada

Continuation of Ser. No. 544,835, Jan. 28, 1975, abandoned, which is a continuation-in-part of Ser. No. 471,850, May 21, 1974, abandoned. This application Sept. 12, 1975, Ser. No. 612,705
Claims priority, application United Kingdom, May 24, 1973, 24994/73
Int. Cl.² B01D *23/24*
U.S. Cl. 210—80 **17 Claims**

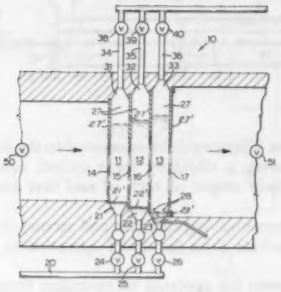
1. A fluid filter comprising:

a. a housing containing a plurality of beds of filter media connected in series, each of said beds being confined in a substantially horizontal direction by at least two substantially vertical means pervious to the flow of fluid, means to admit in-flow fluid to a first bed of said series, said beds being constructed and arranged such that the in-flow flows through said beds in sequence and in a substantially horizontal direction, means to withdraw fluid from a last bed of said series,

b. each of said beds including an expansion chamber located above said beds, said chamber being enclosed in the horizontal direction by impervious walls substantially

coextensive with said pervious means whereby the bed is unconfined in the vertical direction, said filter media filling said beds to a level substantially below the top of said chambers,

c. individual means in each bed for selectively backwashing and fluidizing by expanding the filter media into said expansion chamber in each of said beds simultaneously or individually, said individual backwashing and fluidizing means being located at the bottom of each of said beds,



d. individual means for exhausting backwash fluid from the top of each of said beds whereby flow of backwash fluid through said beds is upward substantially normal to the direction of flow of the in-flow.

e. whereby said exhausting means and said selective backwashing means control the flow of backwash fluid through each of said beds and fluidizes essentially only such bed being backwashed.

4,021,340

BLOOD SEPARATING COMPOSITION

Anthony R. Zine, Jr., Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,127

Int. Cl.² B01D *21/26*

U.S. Cl. 210—83 **9 Claims**

1. A method of separating a sample of whole blood into serum and clot portions comprising the steps of:

1. placing into a container adapted to be centrifuged a quantity of whole blood and a quantity of thixotropic, water-insoluble composition comprising a polybutene liquid polymer having an inert inorganic filler dispersed therein in a quantity sufficient to provide a specific gravity in the composition of 1.030 to about 1.090, a thixotropic index ranging from about 2 to 6, and a viscosity ranging from about 200,000 to 850,000 centistokes; and
2. centrifuging the container under conditions sufficient to cause the blood to separate into serum and clot portions with the composition migrating to a position intermediate the serum and clot portions.

7. A thixotropic composition useful for separating whole blood into serum and clot portions and comprising a polybutene liquid polymer having dispersed therein an essentially inert inorganic filler in a quantity sufficient to impart to the total composition a specific gravity ranging from about 1.030 to 1.090, a thixotropic index ranging from about 2 to 6, and a viscosity ranging from about 200,000 to 850,000 centistokes.

4,021,341

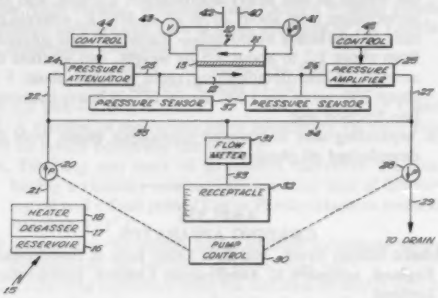
HERMODIALYSIS ULTRAFILTRATION SYSTEM

Louis C. Cosentino, 2435 Holly Lane North, Wayzata, Minn. 55391, and B. Steven Springrose, 3510 Lyndale North, Minneapolis, Minn. 55412

Continuation of Ser. No. 443,700, Feb. 19, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,755

Int. Cl.² B01D *31/00, 13/00*

U.S. Cl. 210—87 **17 Claims**



1. In a hemodialysis system, an improved ultrafiltration circuit which comprises:

input pump means;

pressure attenuator means interconnecting said input pump means and the dialyzer dialysate input;

output pump means;

pressure amplifier means interconnecting said output pump means and the dialyzer dialysate output, said pressure attenuator means and said pressure amplifier means cooperating to control dialyzer pressure on the dialysate side;

means for maintaining the volume flow of said input and output pump means substantially equal; and

means for accepting any dialysate from the dialyzer output which exceeds the volume flow of said output pump means.

4,021,342

LIQUID FILTER

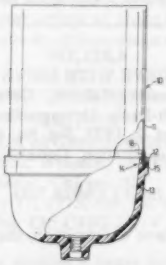
Hans Schacht; Eberhard Bauer, both of Stuttgart; Walter Würth, Bietigheim; Karl Schleicher, Leinfelden, and Wolfgang Soyer, Wiernsheim, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 23, 1975, Ser. No. 615,903

Claims priority, application Germany, Oct. 23, 1974, 2450214

Int. Cl.² B01D *55/14*

U.S. Cl. 210—94 **10 Claims**



1. In a filter, the combination comprising a filter element, a metal housing means with an inlet and outlet for respective

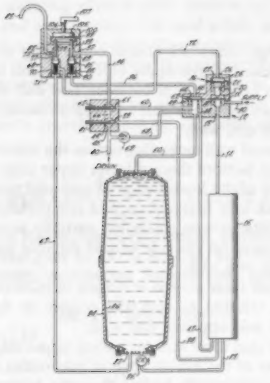
fluid communication with opposite sides of the filter element, said housing means being provided with an open bottom defined by an annular end portion comprising a bent flange, closure means for said end portion consisting of a plastic cup with its peripheral open end portion injection-molded about said bent flange of said annular end portion of said housing means to thereby provide a pressure-resistent and leakproof connection between said housing means and said cup, said open end portion of said cup and said flange of said annular end portion of said housing means having different thermal expansion coefficients; and an annular liner of elastic material interposed between said annular end portion and said bent flange of said housing means and said open end portion of said cup and constituting a barrier against any direct contact between said housing means and said cup, said annular liner being deformable to compensate for the difference in the thermal expansion coefficients when the temperature of said open end portion of said cup deviates from the temperature of said annular end portion and said flange of said housing means.

4,021,343

WATER PURIFIER

Truman V. Tyler, 10107 Stone Arch Drive, Grass Valley, Calif. 95945

Filed June 2, 1975, Ser. No. 582,791
Int. Cl.² B01D *31/00*
U.S. Cl. 210—110 **17 Claims**



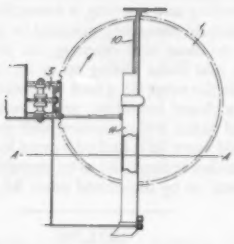
1. A water purifying device comprising
a reverse osmosis filter having an inlet for water to be purified, a purified water outlet and a waste water outlet,
a tank,
a movable member in said tank for dividing said tank into a first section and a second section of variable volumes,
means for connection to a source of water under pressure for conducting water to said inlet of said reverse osmosis filter,
a first valve means for controlling the flow of water to said inlet,
a first purified water passage connecting said purified water outlet of said reverse osmosis filter to said first section of said tank,
a second purified water passage connecting said first section of said tank to a location where purified water is to be drawn for use,
waste water passage means for connecting said waste water outlet of said reverse osmosis filter to said second section of said tank for causing waste water in said second section to exert pressure on purified water in said tank through said movable member for forcing purified water out through said second purified water passage,
a second valve means for controlling the flow of waste water from said filter to said second section of said tank through said waste water passage means,
restricted passage means for draining waste water from said reverse osmosis filter and from said tank,
and valve operating means for opening and closing said first and second valve means,
said valve operating means including hydraulically operated means responsive to the pressure of purified water in said first section of said tank for closing said first valve means when said first section of said tank has received a predetermined amount of purified water.

4,021,344

OIL PICK UP DEVICE

Michael Guthrie Webb, Wootton Bridge, England, assignor to The British Petroleum Company Limited, London, England

Continuation of Ser. No. 519,842, Oct. 31, 1974, abandoned, which is a continuation of Ser. No. 342,452, March 19, 1973, abandoned. This application June 11, 1975, Ser. No. 585,886
Claims priority, application United Kingdom, Mar. 22, 1972, 13402/72; Apr. 27, 1972, 19555/72
Int. Cl.² E02B *15/04*
U.S. Cl. 210—122 **13 Claims**



10. A device for removing oil floating on the surface of water, which comprises: a plurality of discs; means rotatably mounting said discs substantially along different radii of a circle; scrapers contacting each disc so that on rotation of the discs the scrapers remove liquid adhering thereto, said device being supported on floats, whereby, when the device is placed on water the device floats with the discs partly immersed in the water; and means for rotating each disc, whereby oil is picked up along each of said different radii and said circular arrangement of discs causes the oil to be drawn inwardly of the device, said float level control comprising a buoyancy tank adapted to be in fluid communication with water below the water surface when the device floats on a water surface, whereby the buoyancy tank is at least partly filled with water; a main air line connected to the buoyancy tank through a pneumatically operated valve; a secondary air line connected to the pneumatically operted valve, so that variations in pressure in the secondary air line can open and shut the pneumatically operated valve a pressure controller connected to the secondary air line, whereby when the device floats on water surface at the desired level, the pneumatically operated valve is closed, when the device sinks lower in the water the pressure controller increases the pressure in the secondary air line thus opening the pneumatically operated valve and causing air to pass along the main air line to the buoyancy tank to displace water in the buoyancy tank and thus increase the buoyancy of the device.

4,021,345

CENTRIFUGAL DEHYDRATOR

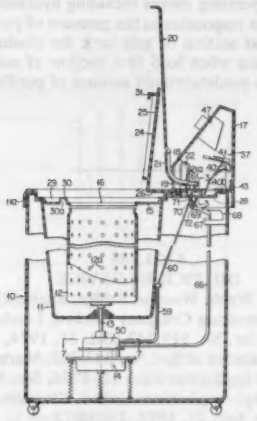
Susumu Oida, Komaki, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed June 30, 1976, Ser. No. 701,737

Claims priority, application Japan, July 3, 1975, 50-93245[U]; Aug. 11, 1975, 50-97308

Int. Cl.² B04B *1/00*

U.S. Cl. 210—146 12 Claims



1. A centrifugal dehydrator comprising an outer casing having an opening, a spin basket rotatably disposed within said casing and faceing said opening, a motor for driving said spin basket, an outer lid swingably mounted on said outer casing so as to open or close said opening, an inner lid swingably mounted on said outer casing so as to open or close said opening inside the outer lid, a lock mechanism for locking said inner lid to a closed condition, and a switch mechanism for actuating said motor and associated with said inner lid so that only when said inner lid is locked by said lock mechanism, the switch mechanism is displaced to an operable position capable of being turned on by the closed outer lid.

4,021,346

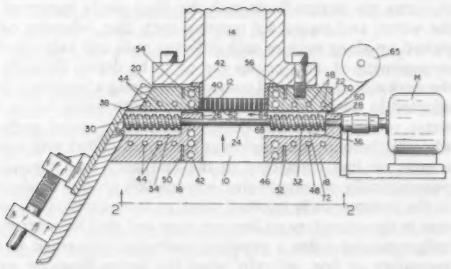
FILTER FOR PLASTIC EXTRUDING MACHINE

Robert L. Berthiaume, 141 Floral St., Shrewsbury, Mass. 01545

Filed Mar. 17, 1975, Ser. No. 558,843

Int. Cl.² B01D *29/02*

U.S. Cl. 210—179 7 Claims



1. Apparatus for filtering heat-softened plastic material, comprising a chamber through which the heat-softened material is forced to flow unidirectionally, a transverse passage including said chamber, filter means in the form of a generally continuous screen located in said passage to travel generally at least in part across the flow of the softened material through the chamber, inlet and outlet ports for the screen, the heat-softened material entering said passage, means to cool the heat-softened material to a hardened state in which the screen filter is embedded, a unidirectional rotatable screw located in the passage and engaging said hardened material and forcing the same in a direction causing the embedded screen to move in said direction presenting a new increment of filter to the chamber, and means to rotate the screw unidirectionally, said screw being wholly embedded in the hardened plastic material.

4,021,347

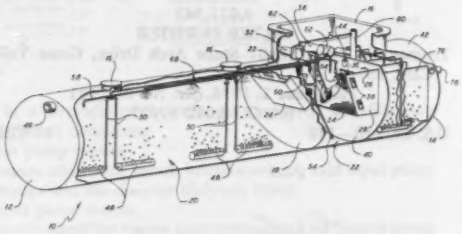
SEWAGE TREATMENT SYSTEM

Ray E. Teller, Sandbrook Road, R.D. 1, Stockton, N.J. 08559, and Sem G. Zachar, Rte. 31, No. Box 470, Washington, N.J. 07882

Filed Jan. 9, 1976, Ser. No. 647,670

Int. Cl.² C02C *1/08;* B01D *23/24*

U.S. Cl. 210—195 S 6 Claims



1. A sewage treatment system comprising in combination:

a. an enclosed, horizontally elongated tank of substantially uniform cross section between two end walls having an inlet opening in one end wall and an outlet opening in the opposite end wall;

b. an internal wall extending across the interior of said tank from the bottom thereof to an upper edge slightly below the level of the lowest edge of said inlet opening, dividing said tank into first and second compartments;

c. a first filter screen extending partially across the interior of said tank on the side of said internal wall nearest said opposite end wall;

d. a second filter screen arranged in substantially parallel, spaced relation to said first screen on the side thereof nearest said opposite end wall;

e. both of said filter screens having upper edges higher than the level of the lowest edge of said outlet opening, lower edges substantially higher than the bottom of said tank and lower than said outlet opening and coplanar side edges;

f. a pair of solid side walls extending from said opposite end wall to the side edges of both of said first and second screens, and a bottom wall extending from said opposite end wall only to the lower edge of said second screen whereby said side and bottom walls, said second screen and said opposite end wall define a third compartment;

g. said side walls having openings in the portions thereof between the side edges of said first and second screens, the area of said openings being sufficiently small that normal flow is essentially longitudinal, through said first screen, and sufficiently large to permit essentially unobstructed lateral flow to the space between said first and second screens in the event of blockage of said first screen; and

h. means within said first compartment for aerating liquid contents thereof, whereby sewage flowing through said tank from said inlet to said outlet openings is aerated in said first compartment, partially purified by gravity settling of a portion of the solids in said second compartment, and further purified by filtration through said

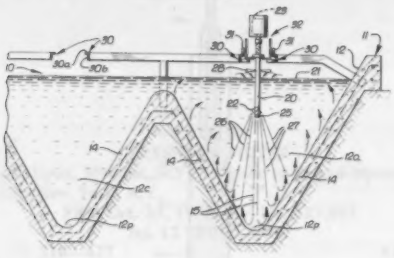
screens in passing from said second to said third compartment.

4,021,348

AERATED SEWERWAGE EFFLUENT DISPOSAL SYSTEM

Alvin Jack Smith, 4379 Modoc Road, Santa Barbara, Calif. 93105

Filed Oct. 15, 1975, Ser. No. 622,685
Int. Cl.² C02C 1/10
U.S. Cl. 210—208 **8 Claims**



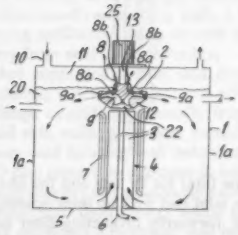
1. In a sewage treatment system,
a. a receptacle for a liquid sewage pool, the receptacle forming a submerged trench having downwardly tapering side walls so that solids tend to collect in a narrow channel at the bottom of the trench,
b. gas injection means to inject gas into the pool to form bubbles traveling downwardly therein to said narrow channel and into contact with said solids, and
c. guide rail means extending directly above and along the trench to guide said gas injection means to travel lengthwise of the trench, said gas injection means being carried by a carriage which is guided and suspended solely by said rail means to travel therealong and in an endless path.

4,021,349

APPARATUS FOR CIRCULATING AND/OR AERATING A LIQUID

Joseph Richard Kaelin, Seeburg, Buochs, Switzerland

Filed June 6, 1975, Ser. No. 584,396
Claims priority, application Switzerland, June 11, 1974, 7941/74
Int. Cl.² B01F 3/04
U.S. Cl. 210—219 **17 Claims**



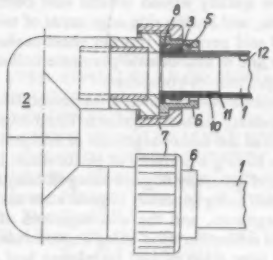
1. An apparatus for circulating and aerating a liquid, especially waste water located in a basin, comprising a basin containing the liquid, a rotatable centrifugal impeller means immersible into the liquid contained within the basin, said rotatable centrifugal impeller means being rotatable about a substantially vertical axis, said rotatable centrifugal impeller means being provided with at least approximately radially extending liquid conveying channels, said rotatable centrifugal impeller means being provided with inlet opening means for the liquid at one end of the liquid conveying channels and outlet openings at the other end of the liquid conveying channels, means provided for the liquid conveying channels for imparting a direction of flow to the liquid departing out of the liquid conveying channels which is at an angle of at least 5° with respect to a substantially horizontal plane towards the side of the rotor provided with the inlet opening means, a flow guiding device having radially and axially extending flow guide surfaces and extending upwardly from the basin floor to a position adjacent the inlet opening means of the impeller means, the radial extent of the flow guide surfaces being at least equal to approximately the radius of the inlet opening means of the impeller means, infeed means for the introduction of oxygen and activated sludge into a suction region of the inlet opening means of the impeller means, and a tubular member arranged centrally with respect to the rotational axis of the impeller means and surrounding the flow guiding device over a major portion of the length of the flow guiding device for the exact guiding of the waste water into the suction region of the impeller means.

4,021,350

MEMBRANE FILTER SYSTEM

Günter Koslowski, Kirchhellen, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed July 22, 1975, Ser. No. 598,022
Claims priority, application Germany, Aug. 3, 1974, 2437446
Int. Cl.² B01D 31/00
U.S. Cl. 210—232 **15 Claims**



11. In a membrane filter system composed of a plurality of membrane supporting pipes disposed parallel to one another and arranged to conduct a flow of concentrate under pressure, each pipe being provided with a tubular membrane, the system further including a deflection sleeve connecting together the end portions of two of the pipes to conduct concentrate between the pipes in such a manner that concentrate is deflected as it passes through the sleeve and such deflection produces forces in the system parallel to the axes of the pipes, the improvement comprising, at each pipe end portion which is connected to said deflection sleeve: a thin stiffening sleeve located within said pipe and arranged to press radially outwardly against said pipe for providing radial stiffening of said end portion and aiding fastening of said membrane in said pipe; a plurality of rounded protuberances formed in said pipe end portion to extend radially outwardly therefrom at a location spaced from the extremity of said pipe end portion, said protuberances being distributed around the periphery of said pipe; a pressure ring disposed around said protuberances and engaging said protuberances in a manner to urge said protuberances in the direction of the axis of said pipe toward the extremity of said pipe end portion; a deflection head disposed to enclose said pressure ring and engaging said pressure ring in a manner to urge said pressure ring in the direction of the axis of said pipe toward the extremity of said pipe end portion; a releasable connecting piece operatively engaging said deflection head and connected to said sleeve for releasably securing said deflection head to said sleeve while applying to said

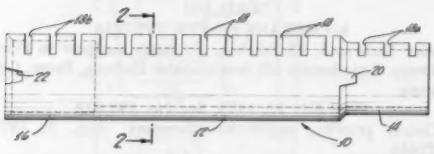
deflection head a force directed along the axis of said pipe toward said deflection sleeve, whereby the axial force established between said sleeve and said deflection head and the engagement between said protuberances and said pressure ring, and between said pressure ring and said deflection head act to press said pipe end portion in an axial direction against said sleeve; and a sealing ring disposed between said pipe end portion and said deflection sleeve and bearing against said pressure ring for sealing the region of connection between said sleeve and said pipe end portion.

4,021,351

MEMBRANE CARTRIDGE WITH IMPROVED CENTRAL COLLECTION TUBE

Donald T. Bray, Escondido, Calif., assignor to Desalination Systems, Inc., Escondido, Calif.

Filed Oct. 30, 1975, Ser. No. 627,078
Int. Cl.² B01D *31/00*
U.S. Cl. 210—232 **4 Claims**



1. A membrane cartridge having a central permeate collection tube with a membrane leaf, a permeate transfer sheet, and a spacer sheet spirally wound around said central permeate collection tube, and having side edge areas of said membrane leaves and of said permeate transfer sheet sealingly attached to each other and to said central permeate collection tube; in which the improvement comprises:

a. said permeate collection tube fabricated from a plurality of interlocking tubular segments fitted together end-to-end, each of the center segments of said permeate collection tube having a plurality of perforations longitudinally spaced and generally aligned along its length, said perforations also being generally aligned after assembly of said center segments, and the end segments of said central permeate collection tube being imperforate; and,

b. the side edge areas of said membrane leaf and said permeate transfer sheet being sealingly attached to said permeate collection tube by circumferential glue lines located outboard of the junctures of the said end segments of said permeate collection tube with adjacent perforated center segments of said permeate collection tube.

4,021,352

FILTER DEVICE FOR SEPARATING BLOOD FRACTIONS

Walter Sarstedt, Numbrecht, Rommelsdorf, Germany, assignor to Walter Sarstedt Kunststoff-Spritzgusswerk, Germany

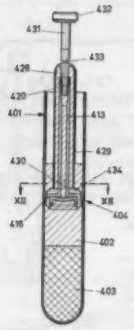
Filed Mar. 25, 1975, Ser. No. 561,729
Claims priority, application Germany, Mar. 30, 1974, 2415618; Nov. 20, 1974, 2454918
Int. Cl.² B01D *33/00*
U.S. Cl. 210—359 **7 Claims**

1. A filter apparatus for separating blood fractions into a specifically heavier fraction and a specifically lighter fraction comprising:

a cylindrical vessel for containing said blood fractions, said cylindrical vessel including a cavity therein;

a piston means adapted for slidable air-tight engagement within the cavity of said cylindrical vessel, said piston means including a filter section permeable for the specifically lighter blood fractions and a hollow riser tube connected to said filter section and adapted to pass liquids filtered by said filter section, the top of said riser tube including a flared upper opening at the top thereof, said piston means including a plurality of projections on the outside thereof; and

a cap extending coextensive with said riser tube, said cap including a closed upper end and an open lower end, said cap including a conical closure plug attached to the inside of said cap and located near the closed upper end thereof, said plug being adapted for seating reception in the upper end of said riser tube, said cap including recesses located



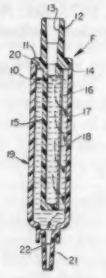
at the lower end thereof which are complimentary to the projections on said piston means, said projections being provided in such a manner that in a first position they engage with the recesses in said cap thereby allowing said plug to come in sealing relationship with the flared opening of said riser tube and in a second position they are out of engagement with said recesses thereby allowing liquid communication between the inside of the riser tube and the inside of the cap.

4,021,353

FLAT PROFILE FILTER

Kenneth Raines, and George K. Burke, both of Bethlehem, Pa., assignors to Burron Medical Products, Inc., Bethlehem, Pa.

Filed Nov. 20, 1975, Ser. No. 633,976
Int. Cl.² A61M *5/16*
U.S. Cl. 210—448 **6 Claims**



1. A flat profile filter for IV sets and the like, comprising: a frame having an inlet end with an inlet opening therethrough and an elongate, forwardly projecting filter securing portion having at least one longitudinally extending, laterally facing opening therein, bounded by a substantially flat, planar, filter attaching surface; a flat, planar sub-micron filter element secured at a peripheral edge thereof to the filter attaching surface in spanning relation to the opening, and disposed to one side of the axis of the inlet opening; and a housing secured at one end thereof to the frame and extending in spaced, enclosing relationship to the forwardly projecting portion of the frame and to the filter element, said housing having an outlet opening at its other end for flow of filtered fluid from the housing, means on said housing other end for attachment of a cannula thereto, and said housing defining a low profile

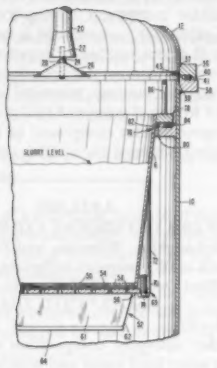
hand grip means to facilitate manipulation thereof and to enable said flat profile filter to be easily attached to a patient or the like, said filter element separating the inlet opening from the outlet opening.

4,021,354

PRESSURE FILTER

Robert Lyon, Manlius, N.Y., assignor to Bristol-Myers Company, New York, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,587
Int. Cl.² B01D *23/02*
U.S. Cl. 210—477 3 Claims



1. A filter assembly for use in filtering a slurry, said filter assembly comprising:

a cylindrical housing, said housing including a removable cover, a downwardly extending wall, a base, and means for supplying unfiltered slurry to and for removing filtered slurry from said filter assembly;

a filter basket supported within said housing, said filter basket including tapered imperforate side walls and a top support flange extending outwardly from an upper portion of said side walls, a support shoulder extending inwardly from said housing wall below said cover, and a resilient O-ring carried in a groove in said support shoulder, said top support flange engaging said support shoulder to support said filter basket within said housing with said O-ring providing a hermetic seal between said filter basket and said housing; and

a filter plate assembly forming a bottom portion of said filter basket, said filter plate assembly including a perforated distribution plate provided with reinforcing ribs attached to the bottom surface of said distribution plate and exterior of said filter basket, a bottom support flange carried at a lower, exterior portion of said filter basket side walls, said distribution plate being secured to said bottom support flange, a support screen carried by said distribution plate within said side walls of said filter basket, and a filter plate of sintered material carried by said support screen within said side walls of said filter basket.

4,021,355

COMPOSITIONS FOR FRACTURING WELL FORMATIONS

Marlin D. Holtmyer; Charles J. Githens, and John M. Tinsley, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Continuation-in-part of Ser. No. 98,157, Dec. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 881,314, Dec. 1, 1969, abandoned. This application Mar. 30, 1973, Ser. No. 346,546
Int. Cl.² E21B *43/26;* B01J *13/00*
U.S. Cl. 252—8.55 R 5 Claims

1. A crosslinked aqueous fracturing gel, having a resistance to turbulent flow of less than that of water and a viscosity after turbulent flow of greater than about 20,000 centipoises, consisting of the reaction product of a hydratable polysaccharide, which has been hydrated with an aqueous liquid, and a crosslinking agent;

wherein said hydratable polysaccharide is present in the range of about 0.3% to about 3% by weight of said aqueous liquid, said crosslinking agent is present in the range of about 0.001% to about 0.5% by weight of said aqueous liquid and said reaction product is produced at a pH in the range of greater than about 5 to about 7; further

wherein said hydratable polysaccharide has a molecular weight of at least about 100,000 and is selected from the group consisting of galactomannan gums and glucomannan gums; and still further

wherein said crosslinking agent is selected from the group consisting of sodium permanganate and potassium permanganate.

4,021,356

ALKOXYLATED ASPHALTS AS CO-SURFACTANTS IN SURFACTANT OIL RECOVERY PROCESSES USABLE IN FORMATIONS CONTAINING WATER HAVING HIGH CONCENTRATIONS OF POLYVALENT IONS SUCH AS CALCIUM AND MAGNESIUM

Mohan V. Kudchadker; Thad O. Walker, both of Houston, and William Schoen, Missouri City, all of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,114
Int. Cl.² E21B *43/22*
U.S. Cl. 252—8.55 D 6 Claims

1. In a method for recovering oil from a subterranean formation containing oil and having an injection well and a production well wherein an aqueous surfactant solution is injected into the injection well in order to drive the oil to the production well where it is produced, said formation containing water having a calcium and/or magnesium ion concentration above about 500 parts per million the improvement which comprises:

injecting water soluble alkoxylated asphalts into the injection well in admixture with an anionic surfactant wherein the asphalt is alkoxylated with alkylene oxides selected from the group consisting of ethylene oxide and propylene oxide and wherein the anionic surfactant and alkoxylated asphalt are present in the aqueous solution in amounts ranging from about 0.05 to 5.0 weight percent each.

4,021,357

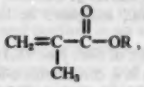
MULTIFUNCTIONAL TETRAPOLYMER LUBE OIL ADDITIVE

Abraham Morduchowitz, Monsey; Terence B. Jordan, Fishkill, and Isaac D. Rubin, Wappingers Falls, all of N.Y., assignors to Texaco Inc., New York, N.Y.

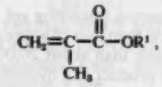
Filed Mar. 10, 1972, Ser. No. 233,774
Int. Cl.² C10M *1/32*
U.S. Cl. 252—51.5 A 3 Claims

1. A lubricating oil composition containing a major amount of hydrocarbon lubricating oil and between about 1 and 15 wt.

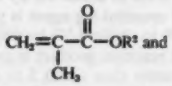
% of a tetrapolymer of a first alkyl methacrylate of the formula:



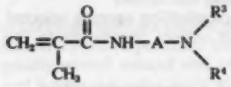
a second alkyl methacrylate:



a third alkyl methacrylate:



a N,N-dialkylaminoalkyl methacrylamide of the formula:



where R is alkyl of from 1 to 5 carbons, R^1 is alkyl of from 10 to 15 carbons, R^2 is alkyl of from 16 to 20 carbons, R^3 and R^4 are alkyl of from 1 to 2 carbons and A is a divalent alkylene radical of from 2 to 4 carbons, said tetrapolymer having an intrinsic viscosity in benzene at 77° F. of between about 0.18 and 2.15, and a component weight ratio of first methacrylate:-second methacrylate:third methacrylate:dialkylaminoalkyl methacrylamide of between about 15:62:20:3 and 25:40:25:10.

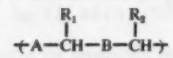
4,021,358

TONER FOR DEVELOPING ELECTROSTATIC LATENT IMAGES

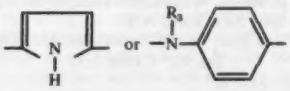
Makoto Tomono, Hino; Goiti Yamakawa, Hachioji; Akira Inoue, Hirakata, and Masahiro Otsuka, Osaka, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed July 3, 1975, Ser. No. 592,989
Claims priority, application Japan, July 12, 1974, 49-80320
Int. Cl.² G03G 9/08, 9/14; C08K 5/34, 5/29
U.S. Cl. 252—62.1 P **4 Claims**

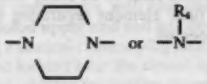
1. A toner for developing electrostatic latent images consisting essentially of an addition condensate having structural units represented by the following general formula:



wherein R_1 and R_2 are hydrogen or lower alkyl, aryl, aralkyl or alkenyl, A is a group



in which R_3 is the same as R_1 and R_2, and B is a group



in which R_4 is the same as R_1 and R_2, and a colorant selected from the group consisting of a pigment, a dye, and a magnetic material, wherein said addition condensate is present in an amount of from 1 to 100 parts by weight and said colorant in an amount of from 1 to 10 parts by weight of said toner, said addition condensate, having an intrinsic viscosity measured at 25° C., of 0.03 to 0.20.

4,021,359

DETERGENT BUILDERS FOR WASHING AND CLEANING COMPOSITIONS

Frederick C. Schwab, Metuchen, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 11, 1973, Ser. No. 405,387
Int. Cl.² C11D 3/20, 7/26, 9/26
U.S. Cl. 252—89 R **3 Claims**

1. A detergent composition consisting essentially of between about 5 percent and about 50 percent, by weight of the total composition, of a detergent-active compound and a detergent builder compound having the formula: R—(OOC—CH=CH—COOM)$_n$, wherein M is an alkali metal or ammonium ion; R is the residue of a polyol selected from the group consisting of pentaerythritol, dipentaerythritol, tripentaerythritol, sorbitol, sucrose, mannitol, and arabitol; and *n* is the number of hydroxyl groups of said polyol; the weight ratio of said detergent builder compound to said detergent-active compound being between about 10:1 and about 1:10.

4,021,360

POWDER DETERGENT COMPOSITIONS

Robert L. McLaughlin, Wilmette, and Donald C. Wood, Des Plaines, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Oct. 15, 1975, Ser. No. 622,622
Int. Cl.² C11D 7/56
U.S. Cl. 252—99 **18 Claims**

1. A powder detergent composition adapted for machine dish washing using hard water and which does not require the presence of large amounts of phosphates consisting essentially of the following components by weight:
   1. from 2–8% of low foaming nonionic surfactant useful for machine dish washing,
   2. from 0.5–5% of available chlorine or oxygen from a bleaching agent,
   3. from 15–70% of borax,
   4. alkali metal hexametaphosphate in an amount providing from 1–5% phosphorus,
   5. solid particulate organic or inorganic buffering agent which will not precipitate calcium or magnesium salts at use concentration, said buffering agent providing a pH in the range of pH 7.0 – pH 8.5 when the composition is placed in 1% water solution, and
   6. any balance of said detergent consisting essentially of inert particulate filler which does not precipitate calcium or magnesium salts at use concentration.

4,021,361

STORAGE-STABLE DETERGENT COMPOSITION CONTAINING SODIUM PERBORATE AND ACTIVATOR

Fui-Tseng H. Lee, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Aug. 25, 1975, Ser. No. 607,478
Int. Cl.² C11D 7/54
U.S. Cl. 252—102 **2 Claims**

1. A storage-stable detergent bleaching composition consisting essentially of a storage-stable mixture of a detergent

and a solid active oxygen compound of the group consisting of sodium perborate and sodium carbonate peroxide, and as an activator, at least 50 molar percentage, based on active oxygen compound of 14-acetoxy-14-azadispiro[5.1.5.2]pentadec-9-ene-15-one 7-oximinoacetate.

4,021,362

GAS GENERATING SYSTEM FOR CHEMICAL LASERS

Ronald E. Channell, Colorado Springs, Colo., and John E. O'Pray, Albuquerque, N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 537,690, Dec. 30, 1974, abandoned. This application July 1, 1975, Ser. No. 592,297

Int. Cl.² C01B *4/00, 1/05*

U.S. Cl. 252—188 2 Claims

1. A solid composition of matter particularly adapted to provide gaseous reactants to a chemical laser comprising a compressed powder mixture composed of (a) about 60 to 70 percent by weight of lithium aluminum deuteride; (b) about 20 to 30 percent by weight of deuteroammonium chloride; (c) about 5 to 15 percent by weight of iron oxide and about 3 to 4 percent by weight of a hydrocarbon polymeric binder.

4,021,363

MATERIAL FOR IMMOBILIZATION OF TOXIC PARTICULATES

Melvin W. Standart, Rancho Cordova, and William E. Spargo, Fair Oaks, both of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Filed July 22, 1975, Ser. No. 598,007

Int. Cl.² G21F *9/34*

U.S. Cl. 252—301.1 W 7 Claims

1. A package for long-term storage of low radiation level particulate comprising:

an outer housing;

a monolithic mass of a non-toxic mixture of natural wax and a polyolefin having a sufficiently low molecular weight to not char at the melting temperature of the mixture disposed within said housing; and

low radiation level radioactive particulate solids dispersed in said monolithic mixture such that said solids are encapsulated and immobilized by said monolithic mixture.

4,021,364

MICROCAPSULES IN THE NANOMETRIC RANGE AND A METHOD FOR THEIR PRODUCTION

Peter Speiser, Forch, and Gerd Birrenbach, Aesch, both of Switzerland, assignors to Prof. Dr. Peter Speiser, Forch, Switzerland

Filed Dec. 4, 1973, Ser. No. 421,604

Claims priority, application Switzerland, Dec. 4, 1972, 017633/72

Int. Cl.² B01J *13/02*

U.S. Cl. 252—316 7 Claims

1. Microcapsules of encapsulated active material, said microcapsules being colloidally soluble in water, said capsules comprising a gel of polymerized acrylamide, polymerized N,N'-methylene-bis acrylamide, polymerized acrylic acid, or methyl acrylate, said microcapsules having a diameter in a micellar order of magnitude of 20–200 nanometers.

3. A process for the production of microcapsules of polymeric material having encapsulated active materials, said microcapsules being colloidally soluble in water and having a diameter in a micellar order of magnitude of 20–200 nanometers, said process comprising:

a. dissolving boundary surface-active auxiliary emulsifying substances in a hydrophobic liquid to form micellar reaction spaces in said hydrophobic liquids;

b. adding to said hydrophobic liquid while stirring, an aqueous solution of an active material to be encapsulated and an encapsulating monomer from the group consisting of acrylamide, N,N'-methylene-bis-acrylamide, acrylic acid, and methyl acrylate, said aqueous solution substantially assuming a presence in said micellar spaces;

c. polymerizing the micellarly dissolved monomers to form microcapsules having said active material absorbed and/or encapsulated in said microcapsules, said polymerization taking place in said micellar spaces in said hydrophobic liquid to produce microcapsules having a diameter of a micellar order of magnitude of 20–200 nanometers; and

d. isolating the resulting microcapsules from the hydrophobic liquid.

4,021,365

SILICA BASE DEFOAMER COMPOSITIONS WITH IMPROVED STABILITY

Joseph V. Sinka, Mendham, and Irwin A. Lichtman, Oradell, both of N.J., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation of Ser. No. 326,570, Jan. 24, 1973, abandoned. This application July 18, 1975, Ser. No. 597,149

Int. Cl.² B01D *19/04*

U.S. Cl. 252—321 15 Claims

1. In an aqueous system defoamer composition containing from 3 to 20% by weight of hydrophobic silica suspended in a carrier liquid, the improvement comprising the addition of a quick-chilled amide in a quantity of from 0.1 to 2.0% by weight so that the hydrophobic silica/carrier liquid suspension is stabilized.

13. A method of defoaming black liquor present in paper manufacture comprising adding thereto from about 0.003 to about 0.5 parts by weight of the solids of the composition of claim 1 per 100 parts by weight of dry paper pulp.

4,021,366

PRODUCTION OF HYDROGEN-RICH GAS

Allen M. Robin, Anaheim, Calif., and Edward T. Child, Tarrytown, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed June 30, 1975, Ser. No. 592,132

Int. Cl.² C01B *2/06, 2/10*

U.S. Cl. 252—373 14 Claims

1. In a process for the production of hydrogen-rich gas stream by reacting a hydrocarbonaceous feed by partial oxidation with a free-oxygen containing gas in the presence of a temperature moderator in the reaction zone of a free-flow gas generator at a temperature in the range of about 1300° to 3500° F and a pressure in the range of about 1 to 250 atmospheres to produce a process gas stream comprising H_2, CO, CO_2, H_2O, particulate carbon, and optionally at least one gas selected from the group CH_4, H_2S, COS, N_2, and A; cooling and contacting said process gas stream with water in a gas cooling and scrubbing zone thereby removing said particulate carbon while introducing supplemental H_2O to produce a shift feed gas stream for water-gas shift conversion having a mole ratio of H_2O to CO in the range of about 1 to 5; the improvement comprising (1) without preheating introducing said shift feed gas stream from said cooling and scrubbing zone at a temperature in the range of about 350° to 550° F directly into a fixed bed of low temperature water-gas shift catalyst, comprising cobalt-molybdenum or copper-zinc oxides, and reacting therein a portion of the CO and H_2O in said shift feed gas stream by exothermic water-gas shift reaction, thereby increasing the temperature of the process gas stream to a value in the range of about 600° to 710° F; (2) passing the process gas stream leaving step (1) without additional heating or cooling directly into a fixed bed of high temperature shift catalyst comprising iron oxide promoted by 1 to 15 weight percent of an oxide from the group Cr, Th, U, Be, and Sb; and wherein the volumetric ratio of low temperature shift catalyst to high temperature shift catalyst is in the range of about 0.05 to 0.5; and reacting together therein CO and H_2O to produce additional H_2 and CO_2; and (3) removing the process gas stream from (2) at a temperature in the range of about 710° to 1000° F enriched in hydrogen.

4,021,367

PROCESS FOR RECOVERING SUSPENDED METAL CATALYST FROM THEIR SUSPENSION

Sándor Gál; Béla Eröss; Ernö Pungor; Géza Sipos, all of Budapest; Adorján Monostory; József Barlai, both of Veszprem, and Margit Szeller nee Németh, Varpalota, all of Hungary, assignors to Budapesti Muszaki Egyetem, Budapest and Peti Nitrogenmuvek, Pet, both of, Hungary

Continuation-in-part of Ser. No. 468,154, May 8, 1974, abandoned. This application Oct. 28, 1975, Ser. No. 626,179

Claims priority, application Hungary, May 8, 1973, GA664

Int. Cl.² B01J *23/94, 25/04, 25/02, 23/70*

U.S. Cl. 252—411 R 1 Claim

1. A process for recovering suspended metal catalysts with pre-determined particle size distribution from their suspension in a liquid phase, in which the suspension is subjected to the effect of a continuously moving magnetic field of a minimum intensity of 200 oersteds produced with at least two discs rotating on a common shaft and immersed into the suspension at most by 50% of their surface area, said rotating at the immersed side being in a direction opposite to the direction of the flow of liquid, the said discs each having at least four magnets mounted onto them in lines parallel with the shaft and wherein neighbouring discs face each other with opposite polarity, wherein the ratio, expressed in terms of absolute values, between the flow velocity v_s of the suspension and the rate of movement v_m of the magnetic field expressed as the peripheral velocity at the edge of the said rotating discs, is adjusted to between 1 and 2, and the ratio, expressed in terms of absolute values, between the magnetic field intensity H in oersteds and the distance d of two neighbouring discs in mm is adjusted to between 60 and 150.

4,021,368

PROCESS OF TREATING MYCELIA OF FUNGI FOR RETENTION OF METALS

Pavel Nemec, Bratislava; Hubert Procházka, Brno; Karel Stamberg, Prague; Josef Katzer, Prague; Jiří Štamberg, Praha; Rudolf Jílek, Brno, and Pavel Hulák, Ceske Budejovice, all of Czechoslovakia, assignors to Ceskoslovenska komise pro atomovou energii Praha, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 331,659, Feb. 12, 1973, abandoned. This application Jan. 20, 1975, Ser. No. 542,515

Int. Cl.² B01D *15/00;* C02B *1/14*

U.S. Cl. 252—427 7 Claims

1. A process of treating as biomass the mycelia of microorganisms to produce a stiffened essentially water-insoluble granulated product for application for the industrial retention from solutions of heavy metal ions chosen from the group consisting of uranium, radium, and lead by cyclically repeated sorption processing of such heavy metal ions by contacting it with solutions of such metal ions, comprising mixing the biomass with at least one polymerizable stiffening component capable of forming a polymeric system in a weight ratio of 1 part biomass to 0.1 – 3 parts stiffening component, polymerizing the biomass and stiffening component mixture to produce a stiffened essentially water-insoluble product, drying the stiffened product, the polymerizing and drying steps being carried out at a temperature of about 90° – 105° C and granulating the resulting dried stiffened product.

4,021,369

ION-EXCHANGED TRANSITION METAL CATALYSTS FOR THE DIRECT OXIDATION OF OLEFINS TO EPOXYALCOHOLS

James E. Lyons, Wallingford, Pa., assignor to Sun Ventures, Inc., Radnor, Pa.

Division of Ser. No. 375,195, June 29, 1973, abandoned. This application Feb. 5, 1975, Ser. No. 547,424

Int. Cl.² B01J *31/02, 29/06;* C07D *301/24*

U.S. Cl. 252—428 1 Claim

1. A catalyst for the oxidation of olefins to form epoxyalcohols comprising a sulfonic acid-type divinylbenzene-polystyrene ion-exchange resin having valence-bonded rhodium and vanadium.

4,021,370

FUEL GAS PRODUCTION

Norman Harris; Thomas Frederick Shevels, both of Stockton-On-Tees, and Alan James Dennis, Middlesborough, all of England, assignors to Davy Powergas Limited, England

Continuation-in-part of Ser. No. 485,625, July 3, 1974, abandoned. This application Oct. 17, 1975, Ser. No. 623,503

Claims priority, application United Kingdom, July 24, 1973, 35130/73; July 24, 1973, 35132/73

Int. Cl.² B01J *27/18, 23/86*

U.S. Cl. 252—437 14 Claims

1. A catalyst consisting essentially of a major amount of iron oxide, a minor, catalytically-effective amount of chromium oxide sufficient to impart stability to the catalyst, and phosphate or tungstate ions chemically-combined therewith, said phosphate or tungstate ions being present in a minor amount sufficient to impart a dehydration function to the catalyst, said amounts being based on the total weight of said components.

4,021,371

PROCESS FOR THE PREPARATION OF METAL OXIDE CATALYSTS AND METAL OXIDE SUPPORTED CATALYSTS

József Petró; Tibor Máthé, and Antal Tungler, all of Budapest, Hungary, assignors to Budapesti Muszaki Egyetem, Budapest, Hungary

Filed Nov. 19, 1975, Ser. No. 633,171

Claims priority, application Hungary, Nov. 29, 1974, BU743

Int. Cl.² B01J *29/00, 23/08*

U.S. Cl. 252—454 4 Claims

1. A process for the preparation of catalysts containing the oxides and/or oxyhydrates of aluminum, silicon, magnesium or zinc either alone or in combination with each other, or catalysts containing a metal or a metal oxide as active component and an above-identified oxide and/or oxyhydrate or a mixture thereof as support, in which powdered metallic aluminum, silicon, magnesium or zinc or a fused mixture thereof, or, when a supported catalyst is to be prepared, a fused mixture also containing one or more catalytically active metals, is admixed with an alkali metal hydroxide or carbonate or an alkaline earth metal hydroxide, said alkaline agent being used in an amount of 0.01 to 2 times the stoichiometric amount with respect to the aluminum, silicon, magnesium and/or zinc component, sufficient water is added to this mixture to only wet same, then the wetted mixture is decomposed substantially entirely in the solid phase while the evaporated water is supplemented continuously, the resulting crude product is suspended in water, and the suspension is neutralized and/or washed until neutral.

4,021,372

CATALYST FOR REDUCING OXIDES OF NITROGEN IN THE EXHAUST GAS FROM INTERNAL COMBUSTION ENGINES AND PROCESS FOR MAKING THE CATALYST

Garbis H. Meguerian, Olympia Fields, and Frederick W. Rakowsky, Naperville, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 329,898, Feb. 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 104,214, Jan. 6, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,468

Int. Cl.² B01J *21/04, 23/72, 23/26, 23/74*

U.S. Cl. 252—465 18 Claims

1. A catalyst for catalytically reducing the oxides of nitrogen in the exhaust gases from an internal combustion engine, which catalyst comprises a catalytic surface of one or more metallic oxides formed on a substantially rigid, reticulated support or substrate of a tough, strong metal or metal alloy

having a melting point in excess of about 2,000° F., said oxides being those of one or more members selected from the group consisting of copper, nickel, iron, and chromium, and said catalyst being prepared by the method consisting of the steps of: (a) plating the surface of said support or substrate with one or more layers of one or more of said members to form a plated support or substrate, (b) heating in an inert atmosphere said plated support or substrate so that the atoms on the surfaces of said members interdiffuse with themselves and with surface atoms of said support or substrate, and (c) exposing said plated support or substrate to oxidizing conditions to oxidize, at least in part, the atoms at or near the surface of said plated support or substrate to form thereat oxides of said members.

4,021,373

METHOD OF PREPARING A CATALYTIC STRUCTURE

Robert Harvey Kane, Ho-Ho-Kus, N.J., assignor to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 411,691, Nov. 12, 1973, Pat. No. 3,925,259. This application Sept. 12, 1975, Ser. No. 612,261

Int. Cl.² B01J *23/72, 23/86*

U.S. Cl. 252—470 10 Claims

1. A process for producing a catalyst structure comprised of nickel, chromium and copper and having a stratified surface material formed as a coherent layer on a substrate, said substrate being a nickel- and chromium-containing alloy, comprising: providing a copper-containing coating on a substrate, said substrate containing at least about 10 weight percent chromium and said coating being deficient in nickel relative to the substrate; and heating said coated substrate in a protective atmosphere to a temperature of at least the melting point of copper to develop a surface area material which is or is capable of being developed into a stratified surface material and a chromium-rich sublayer.

4,021,374

SELECTIVE HYDROGENATING CATALYSTS AND A PROCESS FOR THE PREPARATION THEREOF

József Petró; Tibor Máthé; Antal Tungler, and Zoltán Csürös, all of Budapest, Hungary, assignors to Magyar Tudomanyos Akademia Szerves Kemial Technologiai Tanszek, Budapest, Hungary

Filed Dec. 12, 1974, Ser. No. 531,961

Claims priority, application Hungary, Dec. 19, 1973, MA 2526

Int. Cl.² B01J *23/58*

U.S. Cl. 252—473 6 Claims

1. A process for the production of a selective hydrogenating catalyst, comprising simultaneously depositing an ion, complex or hydroxide of at least one metal belonging to the platinum group and an ion, complex or hydroxide of at least one metal belonging to Group IB or IIB of the Periodic System together onto a support, and thereafter reducing the deposited ions, complexes or hydroxides together in an aqueous liquid at a temperature of 0° to 100° C.

4,021,375

METHOD OF FABRICATING POLYCRYSTALLINE SELENIUM IMAGING DEVICES

Robert Milton Moore, Carmel, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,358

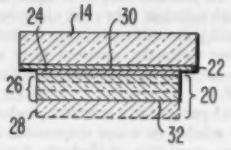
Int. Cl.² H01L *31/00*

U.S. Cl. 252—501 7 Claims

1. In a method of fabricating a photoconductive imaging body having a supported layer of hexagonal selenium selenium in contact with a material at least partially containing thallium, the improvment comprising,

baking said body at an initial temperature less than about 60° C. in an atmosphere containing air or oxygen for at least 15 minutes,

gradually increasing the temperature to a final temperature between about 140° C. and about 180° C.; and



baking at the final temperature for at least 15 minutes, whereby thallium is diffused into said selenium layer.

4,021,376

DETERGENT COMPOSITIONS WITH NONPHOSPHATE BUILDERS CONTAINING TWO OR MORE CARBOXYL GROUPS

Vincent Lamberti, Upper Saddle River, and Susan L. Kogan, New Providence, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 254,146, May 17, 1972, abandoned. This application July 13, 1973, Ser. No. 378,841

Int. Cl.² C02B *1/22, 5/06;* C11D *3/20, 3/22*

U.S. Cl. 252—542 8 Claims

1. A detergent composition comprising a detergent surfactant selected from the group consisting of anionic, nonionic, zwitterionic and ampholytic compounds and mixtures thereof and a nonphosphate detergent builder compound which is the alkali metal, ammonium, morpholinium, alkyl ammonium, mono-, di-, and trialkanol ammonium or tetra-alkyl ammonium salt of dihydroxyfumaric acid the ratio of detergent surfactant to detergent builder being from about 0.4:1 to about 3:1.

4,021,377

LIQUID DETERGENT COMPOSITION

Peter Jochen Borchert, Elkhart, and Jerry Lee Neff, Nappanee, both of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Sept. 11, 1973, Ser. No. 396,184

Int. Cl.² C11D *1/12, 9/30*

U.S. Cl. 252—546 6 Claims

1. A liquid, enzyme stable, phosphate free, detergent composition of matter consisting essentially of:

a. about 15 to 20 percent only of a liquid anionic or nonionic material selected from the class consisting of sodium linear alkylate sulfonate, dimethylamine sulfonate, sodium xylene sulfonate, coconut fatty acid diethanolamide, coconut fatty acid monothanolamide and mixtures thereof;

b. about 30 to 65 percent of a reaction product of citric acid and a water soluble or water dispersible amine selected from the class consisting of monoethanolamine, diethanolamine and triethanolamine with a citric acid/amine mole ratio of 1:1 to 1:3 obtained by reacting the citric acid with the amine at a temperature from about 40 to 110° C for a time from about 5 to 60 minutes or until the citric acid is dissolved;

c. about 15 to 50 percent of a solvent selected from the class consisting of water and water-glycol mixtures wherein said glycol is selected from the class consisting of ethylene glycol, diethylene glycol, propylene glycol and glycerin; and

d. about 0.5 percent of fan enzyme selected from the class consisting of protease, amylase and mixtures thereof, said percentages being by weight based on the total weight of the composition.

2. A method of providing a liquid, enzyme stable, phosphate free, detergent composition of matter, which comprises the step of combining about 0.5 percent of an enzyme selected from the class consisting of protease, amylase and mixtures thereof with the ingredients consisting essentially of:

a. about 15 to 20 percent only of a liquid anionic or nonionic material selected from the class consisting of sodium linear alkylate sulfonate, dimethylamine sulfonate, sodium xylene sulfonate, coconut fatty acid diethanolamide, coconut fatty acid monoethanolamide and mixtures thereof;

b. about 30 to 65 percent of a reaction product of citric acid and a water soluble or water dispersible amine selected from the class consisting of aliphatic, fatty acid and heterocyclic amines with a citric acid/amine mole ratio of 1:1 to 1:3 obtained by reacting the citric acid with the amine at a temperature from about 40° to 110° C for a time from about 5 to 60 minutes or until the citric acid is dissolved; and

c. about 15 to 50 percent of a solvent selected from the class consisting of water and water-glycol mixtures, wherein said glycol is selected from the class consisting of ethylene glycol, diethylene glycol, propylene glycol and glycerin, said percents being by weight based on the total weight of the composition.

4,021,378

MICROCELLULAR FOAMS

Kurt Charles Frisch, Grosse Ile, Mich., and Donald Henry Russell, Cherry Hill, N.J., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed July 31, 1975, Ser. No. 600,661

Int. Cl.² C08G *18/14*

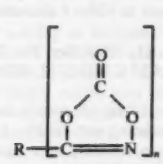
U.S. Cl. 260—2.5 BE **15 Claims**

1. A shelf-stable expandable polyurethane-producing composition comprised of

A. about 100 to 200 parts by weight of a thermoplastic polyurethane having a softening point in the range of about 70°–250° C;

B. about 20 to 100 parts by weight of a mixture comprised of

1. a cyclic nitrile carbonate having the structural formula



wherein R is an organic radical free of reactive hydrogens as determined by the Zerewitinoff test an *n* is at least 2, and

2. an organic polyol, the relative amounts of (1) and (2) present in the composition being such that the ratio of cyclic nitrile groups to total hydroxyl groups is about 0.7 to 10:1; and

C. 0 to 10%, based on the total weight of (B), of a condensation-rearrangement catalyst.

4,021,379

POLYURETHANE FOAM AND METHOD FOR ITS MANUFACTURE

John E. Chaya; Charles Bredbenner; Elmer Minnich, all of Hazleton, and Francis Branz, Freeland, all of Pa., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed May 19, 1975, Ser. No. 578,968

Int. Cl.² C08J *9/14*

U.S. Cl. 260—2.5 AN **10 Claims**

9. A high-resilience, flexible, polyurethane foam which comprises the reaction product of a mixture of a polyether polyol having a hydroxyl functionality of greater than two, a minor amount of a polyester polyol having a hydroxyl functionally greater than two and less than three, an organic aromatic polyisocyanate, a blowing agent, at least one chain extender, an organo-silicon emulsifier-surfactant, and a catalyst, the amount of said polyester polyol being from about 0.5 to about 5 parts by weight per 100 parts by weight of said polyether polyol.

4,021,380

EXPANDABLE RESIN COMPOSITION

Fleet E. Nuttall, Hermosa Beach, Calif., assignor to Mattel, Inc., Hawthorne, Calif.

Filed Feb. 27, 1976, Ser. No. 661,882

Int. Cl.² C08J *9/10*

U.S. Cl. 260—2.5 HA **15 Claims**

1. An expandable resin composition comprising a thermoplastic 1-olefin polymer containing an intimate dispersion of a solid thermally activated organic blowing agent, a solid thermally activatable organic cross-linking agent and a metal borate salt in an amount effective to reduce skin tearing on removal of an expanded part from a hot mold.

4,021,381

INTEGRAL-SKINNED POLYURETHANE FOAM PREPARED IN THE PRESENCE OF A PHOSPHITE OR PHOSPHINE CATALYST

Nils J. Christensen, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 358,183, May 7, 1973, abandoned. This application June 9, 1975, Ser. No. 585,220

Int. Cl.² C08G *18/16*

U.S. Cl. 260—2.5 AZ **12 Claims**

1. In a method for the preparation of an integral-skinned polyurethane foam which comprises the reaction of a polyol and an organic polyisocyanate in the presence of a foaming agent, the improvement which comprises the incorporation into the reaction mixture of a catalytic amount of a catalyst comprising a phosphorous-containing compound selected from the group consisting of an alkylphosphite, an arylphosphite and an aryl-, alkyl-, aminoalkyl-, aminoaryl-, alkaryl- and halide phosphine at a temperature of from 60 ° F. to about 200° F. and a pressure of about 1 to about 5 atmospheres.

4,021,382

METHOD FOR THE PREPARATION OF HYDROPHILIC SPONGY GELS

Artur Stoy; Vladimir Stoy, and Miroslav Stol, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Jan. 21, 1974, Ser. No. 434,944

Claims priority, application Czechoslovakia, Feb. 15, 1973, 1098-73

Int. Cl.² C08J *5/22*, *9/02*

U.S. Cl. 260—2.5 M **16 Claims**

1. A method for the preparation of a spongy hydrophilic acrylonitrile-containing polymer comprising the steps of forming a solution of a polymer containing acrylonitrile in nitric acid having between 47 to 75% concentration with said polymer solution, admixing with said solution 10 to 90% by weight of a thickening agent comprising solid particles of a substance which is (a) insoluble in said acid solution (b) soluble in water, and (c) being operative in aqueous solutions or its nitrate respectively to precipitate said polymer from said nitric acid, shaping the mixture of said polymer solution and solid particles to a desired physical shape, subsequently coagulating said shaped polymer in an aqueous medium, and thereafter washing said solid particles out of the coagulated polymer.

4,021,383

INFUSED POLYMER CONTAINING MONOHYDRIC COMPOUNDS AND POLYURETHANE COMPOSITIONS BASED THEREON

Michael Cuscurida; Lee G. Meyer, and Lewis W. Watts, Jr., all of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,979
Int. Cl.² C08G *18/14, 18/63;* C07G *43/04*
U.S. Cl. 260—2.5 AM 17 Claims

1. An infused polymer containing monohydric composition having at least one polymeric chain chemically bonded through at least one unsaturation site of an oxyalkadienyl containing monohydric compound selected from the group consisting of oxyalkadienyl aliphatic monohydric compounds, oxyalkadienyl polyether monohydric compounds and mixtures thereof wherein said polymeric chain is the polymerization product of at least one polymerizable ethylenically unsaturated monomer.

4,021,384

INFUSED POLYMER CONTAINING POLYOLS AND POLYURETHANE COMPOSITIONS BASED THEREON

Walter H. Brader, Jr.; Michael Cuscurida, and Lewis W. Watts, Jr., all of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,978
Int. Cl.² C08G *18/14, 18/63;* C07C *43/04*
U.S. Cl. 260—2.5 AP 17 Claims

1. An infused polymer containing polyol composition having at least one polymer chain chemically bonded through at least one unsaturation site of an oxyalkadienyl containing polyhydric compound selected from the group consisting of oxyalkadienyl aliphatic polyols, oxyalkadienyl polyether polyols and mixtures thereof wherein said polymer chain is the polymerization product of at least one polymerizable ethylenically unsaturated monomer.

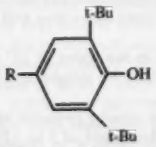
4,021,385

POLYURETHANE FOAMS RESISTANT TO DISCOLORATION

Arthur L. Austin, Southgate; William W. Levis, Jr., and John T. Patton, Jr., both of Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 30, 1974, Ser. No. 537,999
Int. Cl.² C08G *18/14;* C08K *5/13;* C08G *18/48*
U.S. Cl. 260—2.5 BB 10 Claims

1. A polyurethane foam prepared by the reaction of an organic polyisocyanate with a polyether polyol in the presence of a blowing agent, said polyether polyol being a condensation product of an alkylene oxide or mixture of alkylene oxide and a polyhydric alcohol, said product being stabilized against oxidation with from about 0.05 to 0.5 parts by weight of said product of a combination of 4,4′-bis(alphadimethylbenzyl) diphenylamine and a compound of the formula



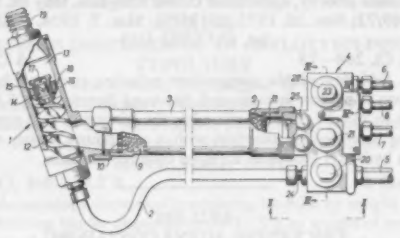
where R is an alkyl of 1 to 9 carbon atoms, said combination containing 10 weight percent or more of each of said amine and said compound, taking said combination as 100 percent.

4,021,386

METHOD OF COMBINING AT LEAST TWO CHEMICAL REACTION COMPONENTS AND APPARATUS FOR CARRYING OUT THE METHOD

Gustav Verner Lindström, Box 37, S-340 33 Lonashult, Sweden

Filed Sept. 24, 1975, Ser. No. 616,419
Claims priority, application Sweden, Sept. 30, 1974, 7412248
Int. Cl.² B29D *27/02*
U.S. Cl. 260—2.5 BC 17 Claims



1. A method of combining in a mixing chamber at least two chemical reaction components, one of which is a foam component which is caused to form a foam, and the other of which is an aerosol component which is atomized to aerosol form, prior to their combination in the mixing chamber, comprising:

supplying the foam component to the mixing chamber via an annular slot;

advancing the foam to the annular slot through two helical grooves which are offset substantially 180° relative to each other and which terminate with slightly different pitches;

rotating the foam component while advancing same through the mixing chamber;

rotating bubbles formed in the foam component relative to each other when the foam is being advanced through the mixing chamber; and

spraying said foam component with the finely distributed droplets of the aerosol component while it is being rotatingly advanced through the mixing chamber.

4,021,387

EOSINOPHILOTACTIC TETRAPEPTIDES

Edward J. Goetzl, and K. Frank Austen, both of Boston, Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.

Filed Nov. 19, 1975, Ser. No. 633,467
Int. Cl.² C07C *103/52;* C08H *1/00*
U.S. Cl. 260—8 9 Claims

6. A compound of the formula

$$Y—X^1—Gly—Ser(OR^1)—Glu(OR^2)—(R)$$

wherein X^1 is Val, Ala, or X where X is selected from the group consisting of

Ile-	Phe-
Tyr-	Hexanoyl-
Cys-	Valeryl-
Met-	Isovaleryl-
N-formyl Met-	Caproyl-
Try-	Isocaproyl-
Leu-	

R^1 and R^2 each independently is selected from benzyl and nitrobenzyl; Y is a solid phase peptide synthesis N-terminal amino protecting group and (R) is a resin employed in a solid phase peptide synthesis.

7. The compound of claim 6 wherein Y is t-butyloxycarbonyl and Ⓡ is copolystyrene-divinyl benzene.

4,021,388

SYNTHETIC RESIN SHEET MATERIAL

Gerald Joseph Louis Griffin, London, England, assignor to Coloroll Limited, London, England

Division of Ser. No. 527,038, Nov. 25, 1974, which is a continuation-in-part of Ser. No. 353,414, April 23, 1973, abandoned. This application Mar. 10, 1976, Ser. No. 665,418
Claims priority, application United Kingdom, May 18, 1972, 23469/72; Nov. 28, 1973, 55195/73; Mar. 7, 1974, 10267/74
Int. Cl.² C08J 3/20
U.S. Cl. 260—13 5 Claims

1. A biodegradable composition including a polymer having carbon to carbon linkages and dispersed therein from 5.5% to 50% by weight of starch granules, the surface of said granules being modified by reaction with a compound which reacts with hydroxyl groups to form an ether or an ester.

4,021,389

THICKENING AGENT CONTAINING HETEROPOLYSACCHARIDE S-10

Thomas A. Lindroth, La Mesa, and Nicholas J. Iammarino, San Diego, both of Calif., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 20, 1975, Ser. No. 624,075
Int. Cl.² C08L 5/00
U.S. Cl. 260—17.4 ST 7 Claims

1. A composition comprising from about 20 percent to about 80 percent by weight of Heteropolysaccharide S-10 and from about 80 percent to about 20 percent by weight of a copolymer of an alkenyl aromatic monomer and an unsaturated acid anhydride in the mole proportions of 1:1 to 2:1 respectively, wherein the copolymer has a molecular weight of at least about 30,000 and wherein about 0.5% to 10% of the acid groups are esterified with a monohydroxyl containing nonionic surfactant having a hydrophile-lipophile balance of at least about 12 and a polyoxyethylene chain with at least about 10 oxyethylene units, the Heteropolysaccharide S-10 containing about 3% by weight of protein and about 97% by weight carbohydrate, the carbohydrate portion of which contains about 19% by weight of a uronic acid, about 39% by weight of glucose, about 29% by weight of galactose, and about 13% by weight of fucose, the heteropolysaccharide being compatible with Methylene Blue chloride dye, being substantially insoluble in dimethylsulfoxide and soluble in water, having an acetyl content of about 4.5%, and a specific rotation of $_D = +106°$ (c 0.25, H_2O).

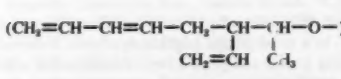
4,021,390

ALKYD RESIN COMPOSITION COMPRISING A 1,1-BIS(1′-METHYL-2′-VINYL-4′,6′-HEPTADIENOXY-)ALKANE

Satoru Enomoto, Fujisawa; Yutaka Mukaida, Tokyo; Mikiro Yanaka, Matsudo; Sadao Nishita, Tokyo; Hisayuki Wada, Tokyo, and Hitoshi Takita, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 17, 1976, Ser. No. 696,928
Claims priority, application Japan, June 20, 1975, 50-74404
Int. Cl.² C09D 3/66
U.S. Cl. 260—22 CB 4 Claims

1. An alkyd resin composition comprising 90 to 10% by weight of an alkyd resin and 10 to 90% by weight of a 1,1-bis(-1′-methyl-2′-vinyl-4′,6′-heptadienoxy)alkane of the formula:



wherein R IS H or an alkyl group having 1 to 7 carbon atoms.

4,021,391

PRESSURE-SENSITIVE ADHESIVE COMPOSITION

Ichiro Ijichi; Shigetoshi Kai; Hikaru Teranishi; Akira Morioka, and Kazuyoshi Seki, all of Ibaraki, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan

Filed Dec. 19, 1975, Ser. No. 642,636
Claims priority, application Japan, Dec. 11, 1974, 49-142663
Int. Cl.² C08L 93/00
U.S. Cl. 260—27 BB 11 Claims

1. A pressure-sensitive adhesive composition for producing a pressure-sensitive adhesive, the pressure-sensitive adhesive composition consisting essentially of a homo- or co-polymer having a molecular weight of 1,000 to 50,000 of diene monomers or a copolymer of diene monomers and a vinyl monomer and containing in the molecule thereof an average of about 2.0 to about 2.5 functional groups capable of reacting with an isocyanate group, an isocyanate compound containing therein 2 or more isocyanate groups, and a tackifier miscible with the diene polymer and the isocyanate compound containing therein at least one polar group selected from the class consisting of —COOH, —OH, and —CH_2OH, wherein the isocyanate compound is present in such amount that the isocyanate group of said isocyanate compound is about 0.75 to about 1.2 equivalents per equivalent of the functional group of the liquid diene polymer, and the tackifier is present in an amount of about 10 to about 70 parts by weight per 100 parts by weight of the total weight of the liquid diene polymer and the isocyanate compound.

4,021,392

MARINE PAINT

Alexander Milne, Jesmond, and George Hails, Whickham, both of England, assignors to The International Paint Company Limited, London, England

Filed Mar. 26, 1975, Ser. No. 562,008
Claims priority, application United Kingdom, Apr. 3, 1974, 14723/74
Int. Cl.² C08K 3/22
U.S. Cl. 260—28.5 A 9 Claims

1. A top coat paint for ships' hulls comprising

a. a film-forming copolymer containing from more than 50 up to 80 percent by weight of units of at least one triorgano tin salt of an olefinically unsaturated carboxylic acid having the general formula $R_3SnOOCR' = CHR''$ where R is the same or different alkyl radical containing up to 8 carbon atoms, an aryl group or an aralkyl group, R′ is hydrogen or a methyl group and R″ is hydrogen or a —$COOSnR_3$ group, the balance of the copolymer being units of at least one olefinically unsaturated comonomer,

b. a substantially water insoluble metalliferous pigment capable of reacting with sea-water to form a water-soluble metal compound, and

c. a hydrophobic organic retarder for retarding the rate of ion exchange between sea-water and the copolymer (a), which retarder

i. has a solubility in sea-water at 25° C of not more than 5 parts per million by weight and is miscible with the copolymer (a),

ii. has a negligible vapour pressure at 25° C, and

iii. is present to the extent of 5 to 120 percent by weight based on the weight of the tri-organo tin ion content of the copolymer (a), and

d. an organic solvent for components (a) and (c).

4,021,393

METHOD AND COMPOSITION FOR SURFACING AND REPAIRING BROKEN PAVEMENTS WITH AN ELASTOMERIC MATERIAL HAVING IMPROVED FLEXING PROPERTIES AT FREEZING TEMPERATURES WITHOUT ANY SIGNIFICANT LOSS OF VISCOSITY AT HIGH APPLICATION TEMPERATURES

Charles H. McDonald, 3130 W. Pierce St., Phoenix, Ariz. 85009

Filed Oct. 14, 1975, Ser. No. 622,143
Int. Cl.² C08L *95/00*
U.S. Cl. 260—28.5 AS **9 Claims**

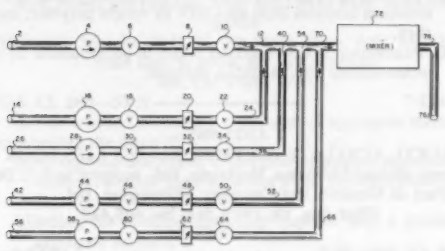
1. An elastomeric paving material prepared by reacting a mixture comprised of paving grade asphalt and non-oil resistant rubber, said paving material containing a malthene in an amount of about 3 to about 20 weight percent of said asphalt-rubber-malthene mixture, whereby said paving material exhibits improved low temperature flexing properties without any significant loss of viscosity at elevated temperatures used to apply said paving material to pavement.

4,021,394

CONTINUOUS PROCESS FOR THE PREPARATION OF A CATIONICALLY MODIFIED ACRYLAMIDE POLYMER

Richard F. Tuka, Oak Lawn; Peter H. Vossos, Lisle; Ralph R. Nielsen, Oak Lawn, and Carl J. Guardia, Joliet, all of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 12, 1975, Ser. No. 631,284
Int. Cl.² C08K *3/00*; C08G *12/06*; C08F *20/56*
U.S. Cl. 260—29.4 UA **1 Claim**



1. A method for the preparation of a dilute aqueous solution of a cationically modified polyacrylamide from a water-in-oil emulsion of a finely divided water soluble acrylamide polymer which comprises the steps of:

A. Forming a continuous process stream, said process stream containing water;

B. Adding to the continuous process stream at a first point a water soluble lower alkyl secondary amine containing 2–4 carbon atoms so as to prepare an aqueous process stream containing 1.0 – 15.0% by weight of the secondary amine;

C. Adding to the continuous process stream at a second point downstream from said first point a water soluble surfactant so as to provide a concentration of the surfactant of from 0.1 to 2.0% by weight in the process stream, said surfactant being characterized as having the ability to invert a water-in-oil emulsion of a water soluble acrylamide polymer;

D. Adding to the continuous process stream at a third point downstream from said second point an aqueous solution of formaldehyde in a concentration sufficient to provide a mole ratio of formaldehyde to secondary amine within said process stream of from 1.1:0.9 to 0.9:1.1;

E. Adding to the continuous process stream at a fourth point downstream from said third point a quantity of a water-in-oil emulsion of a finely divided water soluble acrylamide polymer containing from 20 – 50% polymer by weight in a quantity sufficient to give a mole ratio of amide functionality on said acrylamide polymer to formaldehyde of from 0.9:1 to 1.0:0.9;

F. Mixing continuously the process stream at a fifth point downstream from said fourth point, at a temperature of from 15°–50° C so as to cause inversion of the water-in-oil emulsion of a finely divided acrylamide polymer and effect the reaction of the secondary amine, formaldehyde and acrylamide with each other; and then

G. Recovering continuously at a sixth point downstream from said fifth point a 3 – 15% aqueous solution of a cationically modified acrylamide polymer.

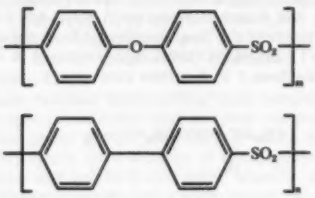
4,021,395

AQUEOUS DISPERSION OF AN ARYLOXYSULFONE COPOLYMER

Eva M. Vary, Wynnewood, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 375,051, June 29, 1973, abandoned. This application June 5, 1975, Ser. No. 584,205
Int. Cl.² C08G *51/24*
U.S. Cl. 260—29.2 R **2 Claims**

1. An aqueous dispersion containing 10–60% by weight of a film-forming binder dispersed in 37–89.9% by weight of water, wherein the dispersed binder particles have a particle size of about 0.02–0.5 microns and are dispersed by an 0.1–3% by weight of a nonionic surfactant or an anionic surfactant; and the binder comprises an aryloxysulfone copolymer of the formula



where *n* and *m* are positive integers from 15 to 2,500.

4,021,396

AQUEOUS COATING COMPOSITION OF AN ACRYLIC POLYMER HAVING REACTIVE SITES AND AN EPOXY RESIN

Souheng Wu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 428,723, Dec. 12, 1973, Pat. No. 3,943,187. This application July 3, 1975, Ser. No. 593,019
Int. Cl.² C08L *33/08*, *33/12*, *35/06*
U.S. Cl. 260—29.6 NR **8 Claims**

1. An aqueous coating composition consisting essentially of about 25-50% by weight of film-forming constituents dispersed in an aqueous medium; wherein the film-forming constituents are a compatible mixture consisting essentially of

a. 60–95% by weight of an acrylic polymer of hard and soft segments having a number average molecular weight above 10,000 determined according to gel permeation chromatography and a glass transition temperature of −20° C. to +60° C.; and wherein the acrylic polymer consists essentially of polymerized units of

10–50% by weight of styrene, methyl styrene, methyl methacrylate or acrylonitrile,

40–89.5% by weight of an alkyl acrylate having 1–18 carbon atoms in the alkyl group or an alkyl methacrylate having 2–18 carbon atoms in the alkyl group,

0.5–10% by weight of an unsaturated carboxylic acid; and

b. 5–40% by weight of an epoxy resin having at least one terminal vic epoxide group in combination with at least one hydroxyl group or epoxide group or mixture thereof

per polymer chain and having a number average molecular weight of 300 to 20,000 determined as above;

wherein the composition contains sufficient basic compound to have a pH of about 5–10 and wherein the film-forming constituents in the fully cured state have a brittle ductile transition temperature of −40° C. to +20° C. measured at an elongation rate of 10% per minute on an Instron testing machine using a free film about 2–4 mils of the fully cured coating composition.

4,021,397
STABLE DISPERSIONS OF WATER SOLUBLE AMIDE POLYMERS

Pravin K. Shah, Sheffield Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 537,361, Dec. 30, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,077
Int. Cl.² C08L *33/26*
U.S. Cl. 260—29.6 N **10 Claims**

1. A latex composition resistant to thickening or gelling or storage comprising a polymer of greater than 50% by weight of a copolymerization product of (A) acrylic acid ester of the formula

$$CH_2=\underset{\displaystyle R}{\overset{|}{C}}-COOR_1$$

wherein R is hydrogen or methyl and R_1 is an alkyl group containing 1 to 8 carbon atoms and, (B) at lest 0.01 weight part of an amide of the formula selected from the group consisting of (1) $CH_2=CHCONHCH_2OA$ wherein A is an alkyl group having from 1 to 8 carbon atoms,

$$CH_2=\underset{\displaystyle R_2}{\overset{|}{C}}-CONHR_3-O-R_4 \qquad (2)$$

wherein R_2 is a member of the group consisting of hydrogen and an alkyl group having from 1 to 4 carbon atoms, R_3 is an alkylene group having from 1 to 8 carbon atoms and R_4 is a member of the group consisting of hydrogen and an alkyl group having from 1 to 8 carbon atoms, and

$$CH_2=\underset{\displaystyle R_5}{\overset{|}{C}}-CONHR_6 \qquad (3)$$

wherein R_5 is a member of the group consisting of hydrogen and an alkyl group having from 1 to 4 carbon atoms and R_6 is a member of the group consisting of hydrogen and an alkyl group having from 1 to 6 carbon atoms and a stabilizing amount of a hydroxylamine salt.

4,021,398
AQUEOUS LATEX EMULSIONS CONTAINING BASIC ALUMINUM COMPOUNDS OF WOOD-STAIN REDUCING AGENTS

William S. Gilman, South Plainfield; John L. Jones, North Plainfield, and Andrew M. Rubino, New Providence, all of N.J., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.

Division of Ser. No. 398,358, Sept. 18, 1973, Pat. No. 3,900,620. This application Apr. 18, 1975, Ser. No. 569,246
Int. Cl.² C08L *31/04*
U.S. Cl. 260—29.6 MM **14 Claims**

1. Water based primer paint comprising a latex emulsion, pigment, and a basic aluminum halide, said basic aluminum halide being present in an amount of 1 to 10 percent by weight of latex solids in said emulsion.

4,021,399
METHOD FOR THE CONCENTRATION OF WATER-IN-OIL EMULSIONS OF WATER SOLUBLE VINYL ADDITION POLYMERS

Wood E. Hunter, Lombard, and Barney Vallino, Homewood, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Mar. 12, 1976, Ser. No. 666,361
Int. Cl.² C08L *33/02, 33/26, 57/12*
U.S. Cl. 260—29.6 H **4 Claims**

1. A process for the concentration of water-in-oil emulsions of water-soluble vinyl addition polymers which comprises the steps of:

A. Heating a water-in-oil emulsion of a water-soluble vinyl addition polymer to a temperature of from 40 °–90° with agitation while maintaining a vacuum, said water-in-oil emulsion of a water-soluble vinyl addition polymer comprising:
   1. From 30 – 95% by weight of an aqueous phase consisting of polymer and water;
   2. From 10 – 40% by weight polymer;
   3. From 5 - 70% by weight of an inert hydrophobic liquid; and,
   4. From 0.1 – 21.0% by weight of a water-in-oil emulsifying agent;

B. Removing by distillation from the water-in-oil emulsion a mixture of water and inert hydrophobic liquid;

C. Maintaining the weight phase ratio of water and inert hydrophobic liquid present in the water-in-oil emulsion at substantially an equal level by returning to the water-in-oil emulsion excess water or hydrophobic liquid distilled;

D. Continuing steps A, B and C above until the water-in-oil emulsion contains from 40 – 60% by weight polymer; and then,

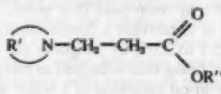
E. Recovering a concentrated water-in-oil emulsion of a water-soluble vinyl addition polymer.

4,021,400
ALKYL ACRYLATE POLYMER HAVING LESS ODOR

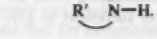
James Michael McKenna, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 18, 1975, Ser. No. 605,415
Int. Cl.² C08F *6/00*
U.S. Cl. 260—30.2 **10 Claims**

1. A composition comprising (a) a copolymer containing polymerized ethylene units, polymerized alkyl acrylate units and polymerized units of a monoalkyl ester of 1,4-butenedioic acid, said alkyl acrylate units being selected from the class consisting of methyl acrylate and ethyl acrylate, the alkyl group of the monoalkyl ester having 1 to 6 carbon atoms, said alkyl acrylate units being present in the amount of 40 to 65% by weight of the polymer, said monoalkyl ester units being present in the amount of 1 to 10% by weight of the polymer, said ethylene units being present in a complemental amount, said polymer having a melt index of 0.3 to 100 grams/10 min. and (b) a compound having the formula



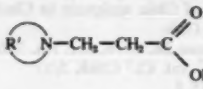
where R′ is an organic diradical containing at least 4 carbon atoms, and R″ is an alkyl group of the same size as the alkyl group of the alkyl acrylate, said compound being present in the amount of between about 0.15 and 2% by weight of the composition said compound having been formed by the reaction of monomeric alkyl acrylate entrained in the copolymer and a secondary amine having the formula



3. The composition of claim 2 which also contains 0.3 to 5 parts per 100 parts by weight of copolymer of a polybutadiene resin having a molecular weight of about 1000 to 3000 and above about 85% by weight pendant vinyl groups.

6. The process for reducing the odor of a polymer of ethylene, alkyl acrylate and a monoalkyl ester of 1,4-butenedioic acid where the alkyl acrylate is selected from the class consisting of methyl acrylate and ethyl acrylate, and the alkyl groups of the ester contain 1 to 6 carbon atoms, containing minor amounts of the monomeric alkyl acrylate, which comprises combining with the polymer a secondary amine having the formula

where R′ is an organic diradical having at least 4 carbon atoms, under conditions such that at least a portion of the alkyl acrylate monomer reacts with the secondary amine to form a compound having the formula



where R″ is an alkyl group of the same size as the alkyl group of the alkyl acrylate.

4,021,401
BUILDING MATERIAL AND METHOD FOR MAKING SAME

Harvey I. Jeppsen, 1042 W. 9th Place, Mesa, Ariz. 85201

Filed Dec. 9, 1974, Ser. No. 530,681
Int. Cl.² C08K *9/10*
U.S. Cl. 260—37 N 7 Claims

1. The method of making a waterproof aggregate material comprising the steps of:

selecting non-absorbent crystalline aggregate material of different particle sizes including large, medium, small and dust and fines of 200 mesh or less,

blending the selected aggregate material into a gradated aggregate mixture,

mixing a liquid polyisocyanate binder with a liquid tertiary amine catalyst,

mixing the combined binder and catalyst with the gradated aggregate mixture,

mixing a liquid phenolic resin with the combined binder, catalyst, and gradated aggregate until each individual particle is completely coated with the phenolic resin components,

pouring the resin-coated gradated aggregate into a form before it hardens,

tamping the resin-coated gradated aggregate in the form before it hardens, and

removing the resin-coated gradated aggregate from the form after it hardens.

4,021,402
METHOD AND COMPOSITION FOR PREVENTING WATER CONTAMINATED WITH INDUSTRIAL WASTE SEEPING THROUGH SOIL CONTAINING SAID WATER

Arthur G. Clem, Des Plaines, Ill., assignor to American Colloid Company, Skokie, Ill.

Division of Ser. No. 472,668, May 23, 1974, Pat. No. 3,949,560, which is a continuation-in-part of Ser. No. 330,200, Feb. 27, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,234
Int. Cl.² C08K *3/34*
U.S. Cl. 260—42.12 9 Claims

1. A composition for forming a water-containing enclosure which composition, after being contacted with water containing substantially no water-soluble industrial waste salts will prevent seepage of water contaminated with water-soluble industrial waste salts, said composition consisting essentially of an intimate admixture of soil and sealing effective amount of a soil-sealant composition consisting essentially of an intimate dry admixture of (A) unhydrated bentonite; (B) a water-soluble dispersing agent selected from the group consisting of a water-soluble salt of phosphoric acid, a water-soluble sulfate of the formula $ROSO_3X$ where R is hydrocarbon of from 8 to 32 carbon atoms, and X is a member selected from the group consisting of an alkaline metal or ammonium, and a water-soluble salt of leonardite; and (C) a water-soluble polymer selected from the group consisting of polyacrylic acid, water-soluble salts of polyacrylic acid, hydrolyzed poly-acrylonitrile, polyvinyl acetate, polyvinyl alcohol, copolymers of the foregoing, and a copolymer of acrylic acid and maleic anhydride, the amount of water-soluble polymer in said soil sealant composition being from 0.1 to 3.0%, by weight, and the amount of water-soluble dispersent in said soil sealant composition being from 0.1 to 3.0%, by weight, the weight ratio of water-soluble dispersent to water-soluble polymer being from 6:1–36.

4,021,403
FLAME RESISTANT THERMOSETTING RESIN COMPOSITION AND METAL CLAD LAMINATE COMPOSED OF THE THERMOSETTING RESIN COMPOSITION

Hiroshi Fujiwara, Soka, and Hiroshi Suzuki, Ichikawa, both of Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Feb. 7, 1975, Ser. No. 548,108
Claims priority, application Japan, Feb. 7, 1974, 49-15923
Int. Cl.² C08G *45/04;* C08K *5/15*
U.S. Cl. 260—42.28 14 Claims

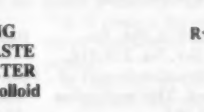
1. A flame resistant thermosetting resin composition comprising an epoxy resin comprising an epoxy compound having at least two epoxy groups per molecule and a halogenated polyhydroxystyrene or a mixture of a halogenated polyhydroxystyrene and polyhydroxystyrene, wherein said halogenated polyhydroxystyrene has a mean degree of polymerization of from about 2 to 10,000 and the equivalent ratio of the number of hydroxyl groups in said halogenated polyhydroxystyrene and polyhydroxystyrene to the number of epoxy groups in said epoxy resin is in the range of 0.3 to 10.

4,021,404
ANTIHARDENERS FOR POLYMERS

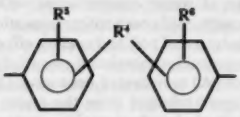
William L. Cox, Mogadore, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 1, 1975, Ser. No. 618,528
Int. Cl.² C08K *5/20*
U.S. Cl. 260—42.32 9 Claims

1. An unvulcanized conjugated diene having incorporated therein a compound having the following strutural formula:



wherein x is 1 or 2, and wherein when x is 1, R is selected from the group consisting of aryl radicals having 6 to 13 carbon atoms (6–13C), alkyl radicals (4–18C), cycloalkyl radicals (5–12C), and aralkyl radicals (7–13C) and wherein when x is 2, R is selected from the group consisting of arylene radicals (6–13C), alkylene radicals (4–18C), cycloalkylene radicals (5–12C), aralkylene radicals (7–13C) and alkylenediaryl radicals having the structure



R^1 is selected from the group consisting of hydrogen and alkyl radicals (1–12C); R^2 is selected from the group consisting of hydrogen, alkyl radicals (1–4C); aryl radicals (6–12C), aralkyl radicals (7–13C), cycloalkyl radicals (5–12C) and carboxymethyl, wherein R^3 is selected from the group consisting of hydrogen, alkyl radicals (1–4C), phenyl, substituted phenyl, cyclohexyl, carboxy and carbalkoxy (2–5C) and wherein R^4 is an alkylene radical (1–4C) and R^5 and R^6 are selected from the group consisting of methyl and ethyl, wherein when R^2 is a substituted phenyl it is substituted with one or two substituents selected from the group consisting of methyl, ethyl, methoxy, ethoxy, carboxy alkyl of 2 to 9 carbon atoms, carboxy aryl of 7 to 9 carbon atoms and chloro.

2. The unvulcanized conjugated diene polymer of claim 1 having incorporated therein a reinforcing agent.

4,021,405
POLYMER SUBSTRATES COATED WITH STABILIZED POLYMERIC COATING COMPOSITION

Robert Jerome Tucker, Hackettstown, and Ruth Greenwood, Somerville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 20, 1975, Ser. No. 560,418
Int. Cl.² C08K *5/13, 5/34;* **C08L** *61/28*
U.S. Cl. 260—45.8 R **11 Claims**

1. An article of manufacture comprising a polymeric substrate having a mar-resistant coating thereon, said coating consisting essentially of the acid catalyzed reaction product of a mixture of (1), (2) and (3), the amount of (1) and (2) ranging from about 5:1 to about 1:1, respectively, in which

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2, respectively, in which
   a. is an isocyanate-terminated urethane which is the reaction product of a mixture consisting essentially of (I) and (II), at a molar ratio of 1:2, respectively, in which
      I. is a saturated diol having a molecular weight of from about 200 to about 3000 and
      II. is a saturated organic diisocyanate and
   b. is a monomeric, sterically bulky, polyhydric alcohol containing 2-6 hydroxyl groups and being free of oxyalkylene units
2. is a polyalkylether of a polymethylol melamine and
3. is an ultraviolet light absorber comprising 2-[(2-hydroxy-5-t-octylphenyl)]benzotriazole or 2,2′-dihydroxy-4-methoxybenzophenone.

4,021,406
FLAME RETARDANT COMPOSITIONS

Irving Touval, Edison, N.J., assignor to M & T Chemicals Inc., Greenwich, Conn.

Division of Ser. No. 361,895, May 21, 1973, Pat. No. 3,912,792, and a continuation-in-part of Ser. No. 278,016, Aug. 4, 1972, abandoned, which is a continuation-in-part of Ser. No. 175,694, Aug. 27, 1971, abandoned. This application Sept. 16, 1975, Ser. No. 613,961
Int. Cl.² C08K *3/22, 5/02, 5/52*
U.S. Cl. 260—45.75 B **6 Claims**

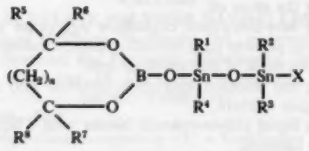
1. A flame retardant composition comprising (a) a polyolefin and (b) between 20 and 40%, based on the weight of said composition, of a mixture consisting of one part by weight of antimony oxide, between one and twelve parts of a halogen-containing organic compound exhibiting a volatilization temperature above 200° C. and selected from the group consisting of Diels-Alder adducts derived from two moles of a hexahalocyclopentadiene per mole of a cyclic hydrocarbon containing two carbon-carbon double bonds, perhalocyclopentadecanes and halogenated biphenyls, and 0.5 to about 15%, based on the combined weight of the antimony oxide and halogen-containing organic compound, of at least one phosphorus compound selected from the group consisting of tris (halophenyl) phosphates and tris (halophenyl) thiophosphates, wherein each phenyl radical exhibits at least three halogen atoms and all halogens present in said flame retardant composition are selected from the group consisting of bromine and chlorine.

4,021,407
SYNERGISTIC ORGANOTIN BORATE STABILIZER COMPOSITIONS AND RESINS CONTAINING SAME

Robert George Gough, Fairfield, and Francis Joseph Buescher, Cincinnati, both of Ohio, assignors to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed June 28, 1976, Ser. No. 700,572
Int. Cl.² C08K *5/57*
U.S. Cl. 260—45.75 J **23 Claims**

11. A plastic composition having improved resistance to early color formation during processing comprising (1) a vinyl halide homopolymer, vinyl halide copolymer or polymer blend containing a vinyl halide homopolymer or vinyl halide copolymer, (2) an organic thiol compound having a molecular weight per thiol group of from 40 to 400 and a boiling point of at least 180° C at one atmosphere pressure, and (3) an organotin halide borate which is a member selected from organotin halide borates having the following general formula:



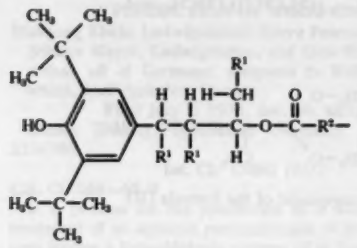
where R^1, R^2, R^3 and R^4 are the same or different and are an aryl group, aralkyl group, alkaryl group or C_1 to C_8 alkyl group, R^5 and R^7 are hydrogen or C_1 to C_4 alkyl group, R^6 and R^8 are C_1 to C_4 alkyl group, X is halogen of atomic weight of 35 to 80 and n is 0, 1 or 2, said organotin halide borate and said organic thiol compound being present in a stabilizing effective amount.

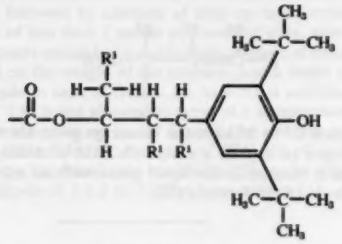
4,021,408
BIS-[4-(m,m′-DI-TERT.-BUTYL-p-HYDROXYPHENYL)-BUTYL-(2)]DICARBOXYLIC ACID ESTERS

Peter Horn; Gernot Teege, both of Ludwigshafen; Werner Fliege, Otterstadt; Frank Weiss, Mannheim, and Bernd Meissner, Heidelberg, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Apr. 3, 1975, Ser. No. 564,617
Claims priority, application Germany, Apr. 25, 1974, 2420006
Int. Cl.² C08K *5/13;* **C07C** *39/12*
U.S. Cl. 260—45.85 T **10 Claims**

1. Bis-[4-(m,m′-di-tert.-butyl-p-hydroxyphenyl)-butyl-(2)] dicarboxylic acid esters of the formula

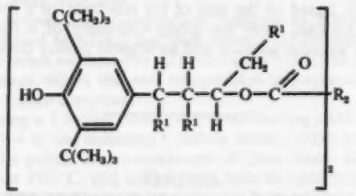




I

wherein the R^1's are identical or different and each is hydrogen or an aliphatic radical and R^2 is an aliphatic, cycloaliphatic, araliphatic or aromatic radical.

9. A polyolefin composition comprising a polyolefin and a thermooxidative stabilizing amount of a compound having the formula



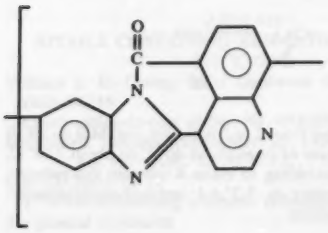
wherein the R^1's are identical or different and each is hydrogen or an aliphatic radical and R^2 is an aliphatic, cycloaliphatic, araliphatic or aromatic radical.

4,021,409
THERMALLY STABLE BENZIMIDAZONAPHTHYRIDINE COMPOSITIONS

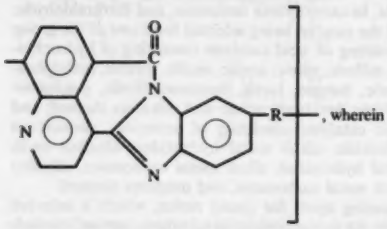
Fred E. Arnold, Centerville, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 19, 1975, Ser. No. 588,736
Int. Cl.² C08G *73/20*
U.S. Cl. 260—47 CP 6 Claims

1. A thermally stable polymer consisting essentially of repeating units having the following formula:

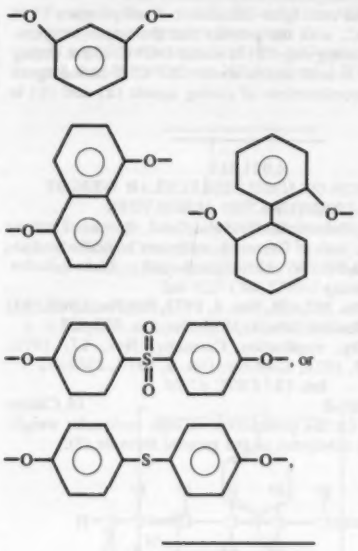


-continued



, wherein

R is a single bond, —O—, —S—, —S(=O)₂—, —C(=O)—,



4,021,410
MELT-SPUN DRAWN OR UNDRAWN FLAME-RESISTANT AND ANTIFUSING CURED EPOXY-MODIFIED NOVOLAK FILAMENTS AND PROCESS FOR PRODUCTION THEREOF

Hiroaki Koyama, Osaka, and Isao Kimura, Suita, both of Japan, assignors to Nippon Kynol Inc., Osaka, Japan

Continuation of Ser. No. 303,873, Nov. 6, 1972, abandoned.
This application Jan. 3, 1975, Ser. No. 538,435
Claims priority, application Japan, Nov. 13, 1971, 46-90981
Int. Cl.² C08G *2/28, 2/30;* B29C *25/00*
U.S. Cl. 260—59 EP 8 Claims

1. A process for producing a flame-resistant and antifusing cured, epoxidized, phenol-aldehyde continuous filament comprising:

A. melting an uncured resin consisting of an epoxidized phenol-aldehyde novolak resin having no substituents other than a 5 to 60% substitution degree of glycidyl etherification of the phenolic hydroxyl group; then

B. forming a filament from the uncured molten resin by melt-spinning; and then

C. curing the melt-spun filament by

1. contacting the melt-spun filament with a curing agent selected from at least one of the group consisting of

a. a curing agent for phenolic resins in combination with an acid or base catalyst, the curing agent being

an aldehyde selected from at least one of the group consisting of: formaldehyde, paraformaldehyde, trioxane, tetraoxane, polyoxymethylene, benzaldehyde, hexamethylene tetramine, and furfuraldehyde; and the catalyst being selected from one of the group consisting of: acid catalysts consisting of hydrochloric, sulfuric, nitric, acetic, oxalic, formic, orthophosphoric, butyric, lactic, benzenesulfonic, p-toluenesulfonic, and boric acids, and mixtures thereof; and basic catalysts consisting of ammonia, ammonium hydroxide, alkali metal hydroxides, alkaline earth metal hydroxides, alkali metal carbonates, alkaline earth metal carbonates, and mixtures thereof;

b. a curing agent for epoxy resins, which is selected from the group consisting of ethanolamine, triethylenetetramine, diaminodiphenylmethane, m-phenylenediamine, trifluoroboronmono-ethylamine, diaminodiphenylsulfone, phthalic anhydride, hexahydrophthalic anhydride, heptoic acid, phenol, and tris-(dimethylaminoethyl)phenol, and

2. heating the melt-spun filament to a temperature of at least 60° C., with the proviso that the upper temperature of heating step (2) is about 140° C. if the curing agent (a) is used and is about 120° C. if curing agent (b) or a combination of curing agents (a) and (b) is used.

4,021,411

PRODUCTION OF HIGH MOLECULAR WEIGHT α,β-UNSATURATED ALDEHYDES

Norbert Goetz, Bobenheim-Roxheim, and Roman Fischer, Ludwigshafen, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

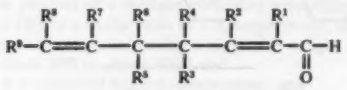
Division of Ser. No. 302,650, Nov. 1, 1972, Pat. No. 3,965,193. This application June 4, 1975, Ser. No. 583,637

Claims priority, application Germany, Nov. 17, 1971, 2157035; Oct. 9, 1972, 2249398; Oct. 9, 1972, 2249372

Int. Cl.² C07C *47/20*

U.S. Cl. 260—601 R **16 Claims**

1. A process for the production of high molecular weight α,β-unsaturated aldehydes of the general formula (I):



where

R^1 is hydrogen, alkyl of one to four carbon atoms, phenyl or phenyl bearing alkyl of one to four carbon atoms as a substituent;

R^2 is hydrogen, alkyl of one to four carbon atoms, phenyl or phenyl bearing alkyl of one to four carbon atoms as a substituent;

R^3 is hydrogen or alkyl of one to four carbon atoms;

R^5 is hydrogen or alkyl of one to four carbon atoms;

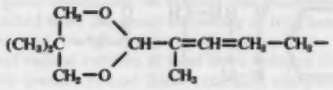
R^6 is hydrogen or alkyl of one to four carbon atoms;

R^7 is hydrogen or alkyl of one to four carbon atoms;

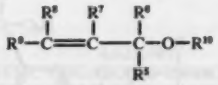
R^4 is hydrogen or a saturated or unsaturated, branched or linear aliphatic or cycloaliphatic hydrocarbon radical of one to twelve carbon atoms;

R^8 is alkyl of one to four carbon atoms or (when R^9 is phenyl) hydrogen; and

R^9 is a member selected from the group consisting of phenyl, a saturated aliphatic hydrocarbon radical of 1–12 carbon atoms, an unsaturated aliphatic hydrocarbon radical of up to twelve carbon atoms, a saturated cycloaliphatic hydrocarbon radical of up to 12 carbon atoms, ethyleneacetal, 1,3-propylene acetal, 2,2-dimethylpropylene acetal, 1,3-dimethylpropylene acetal, diethylacetal, a straight chain, saturated or unsaturated hydrocarbyl ether group having a total of up to 12 carbon atoms and the ether oxygen between carbon atoms of said group, CH_3COOCH_2—, $(CH_3CH_2O)_2CHCH_2$- and

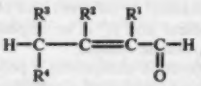


wherein an allyl compound of the formula (II):



(II)

in which R^5 to R^9 have the meanings given above and R^{10} is hydrogen or acyl of a carboxylic acid of oneto five carbon atoms is reacted in the liquid phase with an α,β-unsaturated aldehyde of the formula (III):



(III)

in which R^1 to R^4 have the meanings given above, at elevated temperature of about 60°–300° C. in the presence of 0.1 to 5% by weight, based on the sum of the reactants, of a peroxidic catalyst selected from the group consisting of a hydrogen peroxide aqueous solution and an organic peroxy compound.

4,021,412

ALKALI METAL LACTAMATE CATALYST FOR THE POLYMERIZATION OF DIISOCYANATE WITH TETRACARBOXYLIC ACID/DIANHYDRIDE

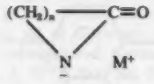
Besir K. Onder, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 7, 1974, Ser. No. 521,745

Int. Cl.² C08G *18/08, 73/00*

U.S. Cl. 260—63 N **11 Claims**

1. In a process for preparing an essentially linear, dipolar aprotic solvent soluble solid polyimide by the condensation of an organic diisocyanate with a polycarboxylic compound containing two intramolecular carboxylic anhydride groups or free carboxylic acids thereof under anhydrous conditions in said solvent, the improvement which comprises adding to the solution of polyimide forming reactants a catalytic amount of a compound consisting essentially of



wherein n is an integer from 2 to 5 inclusive, and M is an alkali metal at a temperature of from about 40° C to about 140° C.

5. The process according to claim 4 wherein the polycarboxylic acid derivative is 3,3′,4,4′-benzophenonetetracarboxylic acid dianhydride.

4,021,413

PRODUCTION OF WOOD GLUE

Wolfgang Eisele, Ludwigshafen; Harro Petersen, Frankenthal; Johann Mayer, Ludwigshafen, and Otto Wittmann, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed July 2, 1974, Ser. No. 485,063

Claims priority, application Germany, July 6, 1973, 2334380

Int. Cl.² C08G *12/12*

U.S. Cl. 260—69 R 4 Claims

1. A process for the production of a wood glue by acid treatment of an aqueous precondensate of formaldehyde and urea having a formaldehyde content of at least 2.5 moles per mole of urea followed by addition of urea up to a formaldehyde content of less than 2 moles per mole of urea, wherein the precondensate which has a condensate content of from 40 to 70% based on the weight of the solution, and a molar ratio of formaldehyde to urea of from 2.5:1 to 4.5:1 is acidified to a pH of from 1 to 3 and allowed to stand at a temperature of from ambient temperature to 40° C until the solution has a viscosity of 5,000 to 150,000 centipoises/20° C, the pH is then adjusted to from 7 to 9 and urea is added until a molar ratio of urea:formaldehyde of 1:1.2 to 1:2 has been reached.

4,021,414

SULFURIC ACID-RESISTANT POLYURETHANE COMPOSITION AND METHOD OF PREPARATION

Jeffrey W. Saracsan, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 534,936, Dec. 20, 1974, Pat. No. 3,942,672. This application Mar. 9, 1976, Ser. No. 665,215

Int. Cl.² C08G *18/62*, *18/32*

U.S. Cl. 260—77.5 AM 3 Claims

1. A polyurethane composition, resistant to sulfuric acid, characterized by having less than about a 10 percent weight increase when immersed in a 25 percent sulfuric acid at 70° C. for 28 days, where the said composition is prepared by the method which comprises

a. mixing a 2,6-dialkylated para cresol having alkyl radicals with 4 to and including 6 carbon atoms, with a polybutadiene polyol at a temperature of from about 40° C. to about 100° C. and sufficient to melt the said polyol,

b. reacting a diisocyanate selected from at least one of diphenyl methane 4,4′-diisocyanate and diphenyl methane 2,4-diisocyanate with the mixture to form a prepolymer having a free isocyanate content of about 2 to about 8 percent,

c. dissolving the prepolymer in a nonreactive solvent to form a sprayable prepolymer solution, and

d. curing the prepolymer by mixing with the prepolymer solution at a temperature of from about 25° C. to about 100° C. a solution in nonreactive solvent of 2,2′-diaminodiphenylidisulfide; where polybutadiene polyol has a molecular weight of from about 1000 to 5000, a corresponding hydroxyl number of from about 110 to about 20 and a hydroxyl functionality of from about 2.1 to about 2.8 and where the ratio of primary amino groups of said diaminodisulfide to free isocyanato groups of said prepolymer is in the range of about 0.5/1 to about 1/1.

4,021,415

NITRILE CONTAINING AROMATIC POLYAMIDE POLYMERS

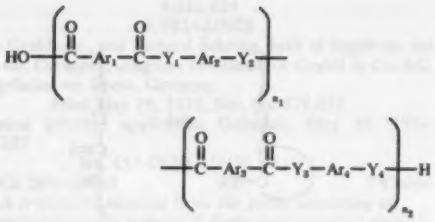
William J. H. Chang, 2673 Goldwood Drive, Rocky River, Ohio 44116

Continuation-in-part of Ser. No. 442,631, Feb. 14, 1974, abandoned. This application Mar. 25, 1974, Ser. No. 454,562

Int. Cl.² C08G *63/18*, *65/32*, *77/12*, *77/14*

U.S. Cl. 260—78 TF 2 Claims

1. Nitrile-containing aromatic polyamide polymers having the general structures



wherein Ar_1 and Ar_3 are aryl radicals, at least one of which contains one nitrile group,

Ar_2 and Ar_4 are aryl radicals which may contain one nitrile group,

Y_1, Y_2, Y_3, and Y_4 are O or NH groups, or mixtures thereof, at least one of which must be an NH group, and wherein Y_1 equals Y_2, Y_3 equals Y_4 and Y_1 is different from Y_3,

n_1 is any integer greater than zero,

n_2 is a positive integer, and the molecular weight of the polymer is from about 100 to about 1,000.

4,021,416

THIOL POLYMERS

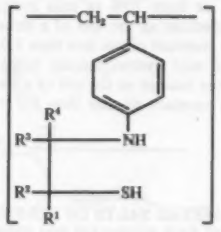
Louis Locatell, Jr., Wellesley Hills, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed May 5, 1975, Ser. No. 574,295

Int. Cl.² C08 *128/02*

U.S. Cl. 260—79.7 5 Claims

1. A polymer comprising segments of the structure:



wherein R^1, R^2, R^3 and R^4 each are selected from hydrogen and lower alkyl containing 1 to 4 carbon atoms.

4,021,417

POLYMERIZATION OF SULFUR CONTAINING COMPOUNDS IN AQUEOUS MEDIA UTILIZING A TETRA-ALKYLATED AZO-BIS-ACETONITRILE

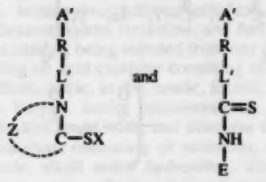
J. Michael Grasshoff, Hudson, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 520,982, Nov. 5, 1974, which is a continuation-in-part of Ser. No. 429,928, Jan. 2, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,364

Int. Cl.² C08F *28/02*

U.S. Cl. 260—79.7 6 Claims

1. The process of polymerizing an alkali metal salt of the compounds selected from:



wherein A′ is an ethylenically unsaturated substituent, R is a resonance stabilized group, L′ is an optional linking group, x is hydrogen, ammonium or metal, Z represents the atoms and bonds necessary to complete a tetrazole ring structure and E is a hydrogen, alkyl or aryl non-functional in polymerization which comprises reacting said salt in an aqueous medium in the presence of a tetra-alkylated azo-bis-acetonitrile catalyst at elevated temperature under deaerated conditions.

4,021,418

METHOD OF REMOVING FORMYL GROUPS FROM N-FORMYL-AMINO ACID AND N-FORMYL-PEPTIDE ESTERS

Tadashi Takemoto, Toyonaka; Fusayoshi Kakizaki, Kawasaki; Yasuo Ariyoshi, and Ichiro Noda, both of Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,746
Claims priority, application Japan, Dec. 5, 1974, 49-140646
Int. Cl.² C07G 7/00; C07C 103/52
U.S. Cl. 260—112.5 R **10 Claims**

1. A method of removing the formyl group from the nitrogen atom of an N-formyl-amino acid ester or N-formyl-peptide ester which comprises reacting said ester with an at least equimolecular amount of hydroxylamine in an inert, liquid medium until the corresponding amino acid ester or peptide ester is formed, at least 70% of said hydroxylamine being present in said medium as the salt of a strong acid having a first dissociation constant of not less than 1.0×10^{-1} at 25° C, the remainder of said hydroxylamine being present in said medium as the free base or as the salt of a weak acid having a first dissociation constant smaller than 1.0×10^{-1} at 25° C.

4,021,419

BASIC METAL SALTS OF SULFUR- AND METHYLENE-BRIDGED POLY-PHENOL COMPOSITIONS, AND EPOXIDE-REACTED DERIVATIVES THEREOF, AND LUBRICANTS CONTAINING THEM

Jack Lee Karn, Cleveland Heights, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Division of Ser. No. 356,662, May 2, 1973, Pat. No. 3,951,830. This application Sept. 4, 1975, Ser. No. 610,360
Int. Cl.² C07G 17/00
U.S. Cl. 260—128 **8 Claims**

1. An oil-soluble composition prepared by reacting, at a temperature of about 50°–125° C., an epoxide with an oil-soluble, basic metal phenate, said phenate being prepared by reacting an excess of a metal base with a sulfur- and methylene-bridged polyphenol composition which is in turn prepared by (A) reacting a phenol with formaldehyde or a reversible polymer thereof and subsequently sulfurizing the methylene-bridged intermediate thus obtained, or by (B) sulfurizing said phenol and subsequently reacting the sulfurized intermediate thus obtained with formaldehyde or a reversible polymer thereof; the sulfurizing agent being sulfur or a halide thereof; at least about 0.4 equivalent of epoxide being employed per mole of phenate.

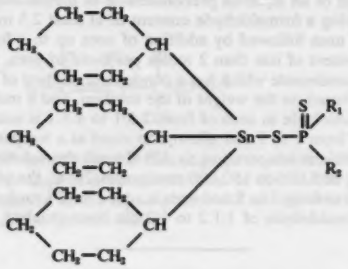
4,021,420

ORGANOTIN MITICIDAL AND INSECTICIDAL COMPOUNDS

Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 466,928, May 6, 1974, Pat. No. 3,947,461, which is a division of Ser. No. 304,871, Oct. 19, 1972, Pat. No. 3,832,370. This application Jan. 5, 1976, Ser. No. 646,734
Int. Cl.² C07F 9/58, 9/65
U.S. Cl. 260—239 B **3 Claims**

1. A compound having the formula



wherein R_1 is lower alkyl having 1 to 4 carbon atoms, and R_2 is selected from the group consisting of piperidyl and hexamethyleneimino, attached through the nitrogen.

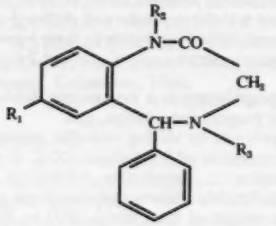
4,021,421

BENZODIAZEPINE DERIVATIVES

Lajos Kisfaludy; Julianna Röhricht; Laszlo Urögdi; Szabolcs Szeberenyi; Eva Palosi, and Laszlo Szporny, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Filed June 23, 1975, Ser. No. 589,079
Claims priority, application Hungary, June 25, 1974, RI 540
Int. Cl.² C07D 243/24
U.S. Cl. 260—239.3 D **16 Claims**

1. A compound of the formula:



wherein

R_1 is halogen, trifluoromethyl, nitro or amino;

R_2 is hydrogen or C_1 to C_6 alkyl; and

R_3 is nitroso,

amino,

C_2 to C_7 alkylidenamino,

aralkylidenamino wherein the aryl is C_7 to C_{20} and the alkkylidenamino is C_1 to C_6,

C_2 to C_7 alkylidenamino or aralkylidenamino wherein the aryl is C_7 to C_{20} and the alkylidenamino is C_1 to C_6 substituted by at least one halogen, hydroxy, trifluoromethyl, nitro, amino, oxo, thio, cyano, sulfo, C_1 to C_6 alkyl, C_5 to C_{20} cycloalkyl, C_5 to C_{20} cycloalkenyl, C_6 to C_{14} aryl, C_1 to C_6 alkoxy, C_7 to C_{20} aralkyl, allyl, allyloxy, aryloxy selected from the group which consists of phenoxy, naphthoxy, and diphenoxy; and aralkoxy selected from the group which consists of benzyloxy,

phenethoxy, phenylpropxy, phenylbutoxy, naphthylmethoxy, naphthylethoxy, naphthylpropoxy and naphthylbutoxy,

acylamino wherein the acyl is the acyl group of a carboxylic acid and is C_1 to C_6 aliphatic, C_7 to C_{20} aromatic or substituted acylamino wherein the acyl is the acyl group of a carboxylic acid and is C_1 to C_6 aliphatic or C_7 to C_{20} aromatic containing at least one halogen, C_1 to C_6 alkyl, allyl, C_1 to C_6 alkoxy, C_5 to C_{20} cycloalkyl, nitro, amino hydroxy, trifluoromethyl, cyano, sulfo, thio or oxo.

4,021,422
PROCESS FOR THE RECOVERY OF ε-CAPROLACTAM FROM REACTION MIXTURE OF ε-CAPROLACTAM AND SULPHURIC ACID

Abraham H. De Rooij, Geleen, and Jan Elmendorp, Brunssum, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Aug. 1, 1975, Ser. No. 601,018

Claims priority, application Netherlands, Aug. 5, 1974, 7410450

Int. Cl.² C07D *201/16*

U.S. Cl. 260—239.3 A **6 Claims**

1. In a process for the recovery of ε-caprolactam from a reaction mixture of ε-caprolactam and sulphuric acid, in which the sulphuric acid is neutralized in the presence of water by adding ammonia to the reaction mixture, the improvement comprising effecting neutralization at pressures exceeding one atmosphere and up to 10 atmospheres in the absence of ammonium sulphate crystals and/or recycled mother liquor containing ammonium sulphate, with dissipation of the heat of neutralization by evaporation of water to form steam, and separating the neutralized mixture into a lactam layer and an aqueous ammonium sulphate layer.

4,021,423
SYNTHESES OF 24R,25- AND 24S,25-DIHYDROXYCHOLECALCIFEROL

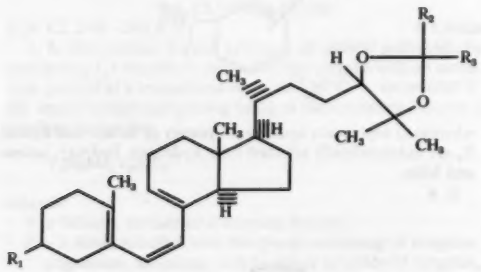
Enrico Baggiolini, Nutley; John Joseph Partridge, Jr., and Milan Radoje Uskokovic', both of Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 8, 1976, Ser. No. 664,799

Int. Cl. C07j *71/00*

U.S. Cl. 260—239.55 D **17 Claims**

1. A compound of the formula



wherein R_1 is hydroxy or lower alkanoyloxy, R_2 and R_3 each independently are lower alkyl, R_2 and R_3 taken together are lower alkylene and the absolute configuration at C-24 is R or S.

4,021,424
S-TRIAZINES

Hans Grabinger, and Richard Sehring, both of Ingelheim am Rhein, Germany, assignors to Celamerck GmbH & Co. KG, Ingelheim am Rhein, Germany

Filed May 19, 1975, Ser. No. 579,015

Claims priority, application Germany, May 24, 1974, 2425287

Int. Cl.² C07D *251/50, 251/52*

U.S. Cl. 260—249.8 **7 Claims**

1. A compound selected from the group consisting of
2-methylthio-4-(N-isobutyl-N-diethylaminomethyl-amino)-6-isopropylamino-s-triazine,
2-methylthio-4-(N-isobutyl-N-ethylthiomethyl-amino)-6-isopropylamino-s-triazine,
2-chloro-4-(N-isobutyl-N-diethylaminomethyl-amino)-6-isopropylamino-s-triazine,
2-methylthio-4-(N-isobutyl-N-isopropylaminomethyl-amino)-6-isopropylamino-s-triazine,
2-chloro-4-(N-isopropyl-N-methylthiomethyl-amino)-6-isopropylamino-s-triazine, and
2-chloro-4-(N-isopropyl-N-isopropylaminomethyl-amino)-6-methylamino-s-triazine.

4,021,425
PROCESS FOR PRODUCING ENONE INTERMEDIATES

Keith Blakeney Mallion, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

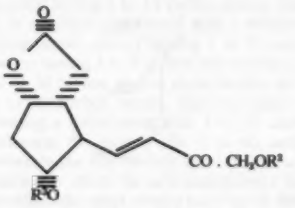
Filed Nov. 13, 1975, Ser. No. 631,606

Claims priority, application United Kingdom, Dec. 12, 1974, 53757/74

Int. Cl.² C07D *307/77*

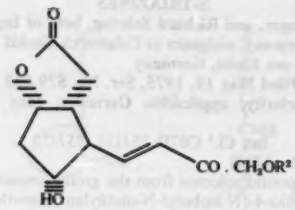
U.S. Cl. 260—240 R **6 Claims**

1. A process for the manufacture of an econe of the formula:



wherein R^2 is phenyl or naphthyl which is unsubstituted or bears one or more substituents selected from halogen, hydroxy, phenyl, alkyl, alkenyl, halogenoalkyl or alkoxy each of 1 to 4 carbon atoms or dialkylamino wherein each alkyl is of 1 to 4 carbon atoms, and R^3 is benzoyl or 4-phenylbenzoyl, which comprises the following four successive stages:

1. the reduction with a complex metal hydride of 4β-dimethoxymethyl-2,3,3aβ,6aβ-tetrahydro-5α-hydroxy-6β-iodo-2-oxocyclopenteno[b]-furan to give 4β-dimethoxymethyl-2,3,3aβ,6aβ-tetrahydro-5α-hydroxy-2-oxocyclopenteno[b]furan;
2. the hydrolysis in a two-phase system comprising a mineral acid and a water-immiscible organic solvent of the product from stage (1) to give 2,3,3aβ,6aβ-tetrahydro-5α-hydroxy-2-oxocyclopenteno[b]-furan-4β-carbaldehyde;
3. the reaction of the product from stage (2) with a phosphonate of the formula $(R_4O)_2PO.CH_2COCH_2OR^2$, wherein R^2 has the meaning stated above and R^4 is alkyl of 1 to 6 carbon atoms, in the presence of a base, to give an enone of the formula:



4. the acylation of the product from stage (3) with a reactive derivative of benzoic acid or 4-phenylbenzoic acid.

4,021,426

PROCESS FOR PREPARING 6-AMINOPENICILLANIC ACID, 7-AMINOCEPHALOSPORANIC ACID AND ITS DERIVATIVES AT THE 3-POSITION

Ernesto Oppici, and Anacleto Gianantonio, both of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

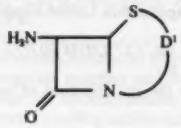
Filed July 17, 1975, Ser. No. 596,699

Claims priority, application United Kingdom, Aug. 7, 1974, 34754/74

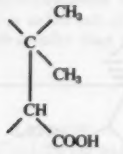
Int. Cl.² C07D *501/04, 499/08*

U.S. Cl. 260—243 C **14 Claims**

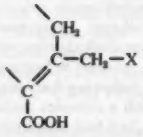
1. In a process for preparing 6-aminopenicillanic acid, 7-aminocephalosporanic acid and derivatives at the 3-position of 7-aminocephalosporanic acid, said compounds being represented by the following general formula



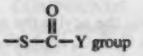
wherein D^1 may be the group



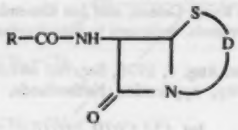
or the group



in which the carbon atom bearing the carboxy group is linked to the nitrogen atom of the β-lactam ring, and in which X represents hydrogen, hydroxy, sulfhydryl, halo, azido, cyano, (C_{1-6}) alkyl, (C_{2-4})-alkanoyloxy, carbamoyloxy, (C_{1-6}) alkylcarbamoyloxy, aryloxy, aralkyloxy, aroyloxy, arylalkanoyloxy wherein the aromatic portion is represented by a phenyl or naphthyl radical optionally substituted with (C_{1-4}) alkyl, (C_{1-4})-alkoxy, halo and nitro groups and the alkyl or alkanoyl portions contain from 1 to 4 carbon atoms, tri-(C_{1-4})-alkylammonio, pyridinio, (C_{1-4}) alkyl-substituted pyridinio, an —S—Y or



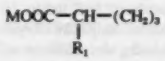
wherein Y represents (C_{1-6}) alkyl, (C_{2-6}) alkanoyl, aryl and aralkyl as above defined, a 5–7 membered heterocyclic ring containing O, N and S and optionally substituted with (C_{1-4}) alkyl, hydroxy, hydroxy (C_{1-4}) alkyl or trifluoromethyl, selected from the group consisting of thiazole, isothiazole, oxazole, isooxazole, 1,3,4-thiadiazole, 1,2,4-thiadiazole, 1,2,5-thiadiazole, 1,3,4-oxadiazole, 1,2,3-oxadiazole, 1,2,5-oxadiazole, 1,2,4-triazole, 1,2,3-triazole, tetrazole, pyridine, pyridazine, purimidine and pyrazone, the improvement which comprises reacting a molar proportion of a substrate of the formula



or an acid salt thereof, wherein R is selected from:

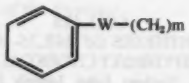
a. an alkyl group of 2 to 8 carbon atoms;

b. a



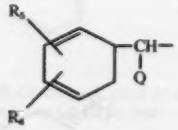
wherein M is hydrogen or metal or ammonium cations and R_1 is hydrogen, amino or a protected amino group;

c. a



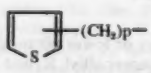
wherein W represents O, S or a carbon-carbon bond, and *m* is an integer from 0 to 3, with the proviso that when W is oxygen or sulfur, *m* is different from zero;

d. a

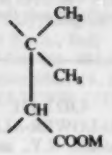


wherein Q represents hydrogen, hydroxy or amino and R_5 and R_6 are independently selected from hydrogen, hydroxy, amino and halo;

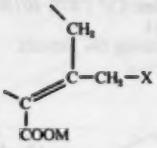
e. a



wherein *p* is an integer 1 to 3; D is the group



or the group



in which the carbon atom bearing the COOM group is linked to the nitrogen atom of the β-lactam ring and M and X are as above defined, with a molar excess of an oxalyl halide of formula halCOCOhal, wherein hal stands for a halogen atom, in an organic solvent, in the presence of an acid binding agent, at a temperature comprised between about −10° and about −60° C, for 25 to 40 minutes, whereby the —COOM group is transformed into the group COO—–COCOhal in which hal is as above defined, treating the obtained compound with a halogenating agent selected from phosphorus pentachloride, phosphorus pentabromide, thionyl chloride, phosphorus tribromide, phosphorus oxychloride, phosgene and p-toluenesulfonylchloride at a temperature comprised between about −30° and about −50° C,in the presence of an acid binding agent for one to two hours and subsequently with a (C_{1-4}) alkyl orthoformate or an alcohol selected from (C_{1-4}) alkanols, phenyl(C_{1-4}) alkanols, (C_{5-7}) cycloalkanols and (C_{2-6}) alkanediols, at a temperature ranging between about −30° and −50° C, in the presence of an acid binding agent, and hydrolyzing the otained iminoether in a mixture of water and a (C_{1-4}) alkanol, for about nine to about 14 hours, at a temperature between about −5° and 10° C, at an acidic pH comprised between about 3 and about 5.

4,021,427
OXIDATION OF 1,3-BUTADIENE TO MALEIC ANHYDRIDE USING A CATALYST CONTAINING MO, SB, V AND EITHER ONE OR BOTH OF LI AND CE

Serge R. Dolhyj, Parma, and Ernest C. Milberger, Solon, both of Ohio, assignors to The Standard Oil Company (Ohio), Cleveland, Ohio

Filed Dec. 15, 1975, Ser. No. 640,997
Int. Cl.² C07D *307/60*
U.S. Cl. 260—346.8 A **8 Claims**

1. In the process for the synthesis of maleic anhydride by contacting 1,3-butadiene and molecular oxygen with an oxidation catalyst at a temperaure of about 250° C. to about 600° C. the improvement comprising using as the oxidation catalyst a catalyst containing

$$Y_aSb_bMo_cV_dZ_eO_x$$

wherein

Y is lithium, cerium or a mixture thereof;

Z is a metal selected from the group consisting of tungsten, magnesium, aluminum and nickel or an oxide of tungsten, magnesium, aluminum and nickel; and

wherein

a and *d* are numbers from about 0.01 to about 1.0; *b* and *c* are numbers from about 1 to about 9;

e is a number from 0 to 1;

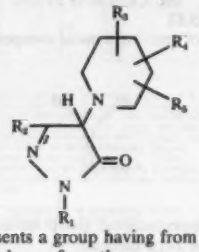
x is a number which satisfies the valence requirements of the other elements present.

4,021,428
4-PIPERIDINO-5-OXO-2-PYRAZOLINES

Nobuo Furutachi, and Atsuaki Arai, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 455,094, March 27, 1974, abandoned. This application Aug. 22, 1975, Ser. No. 607,740
Claims priority, application Japan, Mar. 27, 1973, 48-35378
Int. Cl.² C07D *401/04*
U.S. Cl. 260—293.7 **8 Claims**

1. A compound of the formula (X):



wherein R_1 represents a group having from about 6 to about 40 carbon atoms chosen from the group consisting of phenyl substituted with one or more of the following; alkly groups having 1 to 30 carbon atoms, alkoxy having 1 to 30 carbon atoms, phenyl, naphthyl, phenoxy, naphthoxy, phenoxy or napthoxy substituted with a group having 1 to 10 carbon atoms, halogen, alkoxycarbonyl having 1 to 30 carbon atoms, acylamino having 1 to 30 carbon atoms, carbamoyl having 1 to 30 carbon atoms, sulfo, alkylsulfonamido having 1 to 30 carbon atoms; phenylsulfonamido, naphthylsulfonamido, phenyl- or naphthylsulfonamido having a substituent having 1 to 20 carbon atoms, sulfamoyl having 1 to 30 carbon atoms or a carboxy group; R_2 represents hydrogen, halogen, amino, hydroxy, sulfo, alkyl having 1 to 45 carbon atoms, phenyl, naphthyl, phenyl or naphthyl substituted with a substituent having 1 to 30 carbon atoms, alkoxy having 1 to 45 carbon atoms, cycloalkylamino having 3 to 8 carbon atoms with a substituent containing 1 to 30 carbon atoms, dialkylamino in which each alkyl has 1 to 20 carbon atoms, diphenylamino or dinaphthylamino having a substituent with 1 to 15 carbon atoms, arylamino wherein the moiety has 6 to 45 carbon atoms, acylamino wherein the acyl moiety has 1 to 45 carbon atoms, N-alkylacylamino in which the acyl moiety has 1 to 30 carbon atoms and in which the alkyl moiety has 1 to 10 carbon atoms, carbamoyl having 1 to 45 carbon atoms, phenylacylamino or naphthylacylamino, in which the acyl moiety has 1 to 20 carbon atoms, phenylacylamino in which the acyl moiety has 1 to 20 carbon atoms and having a substituent having 1 to 10 carbon atoms, ureido, N-alkylureido, N-phenylureido, N-naphthylureido having 1 to 45 carbon atoms, N-substituted phenylureido and N-substituted naphthylureido having 1 to 20 carbon atoms in the substituent group, N-cycloalkylureido having 1 to 20 carbon atoms, and diacylamino in which the acyl substituent has 1 to 20 carbon atoms; R_3, R_4 and R_5 each represent hydrogen, hydroxy, halogen, amide, sulfoalkyl havng 1 to 20 carbon atoms, aralkyl having 1 to 20 carbon atoms, alkoxy having 1 to 20 carbon atoms, phenoxy, naphthoxy, phenoxy having a substituent having 1 to 14 carbon atoms, naphthoxy with a substituent having 1 to 10 carbon atoms, acylamino in which the acyl moeity has 1 to 20 carbon atoms, alkylsulfonamido having 1 to 20 carbon atoms, phenylsulfonamido having 1 to 20 carbon atoms, phenylsulfonamido, naphthylsulfonamido, phenylsulfornamido having a substituent having 1 to 14 carbon atoms, naphthylsulfonamido having a substituent having 1 to 10 carbon atoms, alkylamino having

1 to 20 carbon atoms, phenylamino, naphthylamino, phenylamino having a substituent having 1 to 14 carbon atoms, and R_3 and R_4 can combine together to represent cyclopentane, cyclohexane, cycloheptane, benzene, benzene substituted with halogen, amino, hydroxy, sulfo, carboxy, sulfonamido, alkyl, alkoxy, acylamino, alkylamino, arylamino, pyridine, dihydrofuran, dihydrothiophene or thiophene.

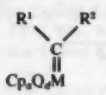
3. The compound 1-(2,4,6-trichlorophenyl)-3-[3- (2,4-di-tert-amylphenoxy)-acetamido -benzamido]-4-piperidino-5-oxo-2-pyrazoline.

4,021,429
SYNTHESIS OF ETHYLENICALLY UNSATURATED COMPOUNDS FROM ESTERS OR AMIDES

Richard Royce Schrock, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 24, 1975, Ser. No. 599,015
Int. Cl.² C07D *295/02*
U.S. Cl. 260—293.51 **12 Claims**

1. The process of reacting a metal compound of the formula



in which

Cp is a π-cyclopentadienyl group having up to one alkyl substituent of 1–10 carbons;

Q is alkyl of 1–10 carbons, aralkyl of 7–10 carbons or diarylmethyl of 13–21 carbons in which the β-carbon is not bonded to hydrogen;

M is niobium or tantalum;

R^1 and R^2 individually are hydrogen, tertiary alkyl of 4–10 carbons or aryl of 6–10 carbons;

a is 0 or 2;

d is 1 or 3; and

a plus *d* equals 3;

with an organic carbonyl compound of the group consisting of an ester of a carboxylic acid and an N,N-disubstituted amide of a carboxylic acid, said carbonyl compound being free of Zerewitinoff-active hydrogen and any multiple bond present, other than that in the carbonyl group, being a carbon to carbon multiple bond or a multiple bond contained in an aromatic heterocyclic ring, at a temperature in the range of 0°–250° C, in the substantial absence of oxygen and moisture, to produce an ethylenically unsaturated compound.

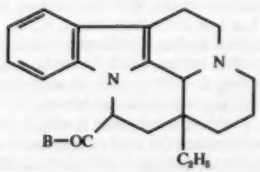
4,021,430
DIHYDROAPOVINCAMINIC ACID AMINES

Michel Marie René Plat, and Monique Plat born Berry, both of Antony, France, assignors to Synthelabo, Paris, France

Filed June 26, 1974, Ser. No. 483,351
Claims priority, application France, June 19, 1974, 74.21210
Int. Cl.² C07D *57/08*
U.S. Cl. 260—293.53 **3 Claims**

1. A compound of the general formula:

(I)



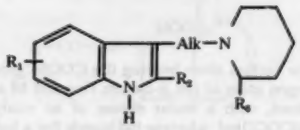
wherein B is an $—NR_1R_2$ group wherein R_1 is a hydrogen atom or a saturated or unsaturated, linear or branched C_{1-4} aliphatic hydrocarbon group, and R_2 is a saturated or unsaturated, linear or branched C_{1-4} aliphatic hydrocarbon group, a phenyl C_{1-4} alkyl or a cycloalkyl C_{1-4} alkyl group; or a pharmaceutically acceptable acid addition salt thereof.

4,021,431
3-(PIPERIDINO-LOWER-ALKYL)-INDOLES

Bernard L. Zenitz, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 439,279, Feb. 4, 1974, which is a continuation-in-part of Ser. No. 261,739, June 12, 1972, abandoned. This application Nov. 20, 1975, Ser. No. 633,939
Int. Cl.² C07D *401/06*
U.S. Cl. 260—293.61 **2 Claims**

1. A compound having the formula



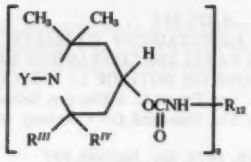
where R_1 is trifluoromethoxy; R_2 is lower-alkyl, R_6 is cycloalkyl-lower-alkyl, and Alk is lower-alkylene.

4,021,432
PIPERIDINE DERIVATIVES

Brian Holt, Royton, and Donald Richard Randell, Stockport, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 310,031, Nov. 28, 1972, abandoned. This application May 14, 1975, Ser. No. 577,502
Claims priority, application United Kingdom, Nov. 30, 1971, 55487/71; June 17, 1972, 28458/72; July 28, 1972, 35473/72
Int. Cl.² C07D *401/12*
U.S. Cl. 260—293.64 **7 Claims**

1. A compound having the formula:



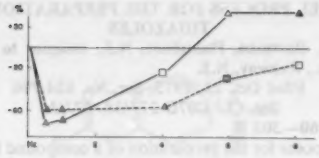
wherein R^{III} and R^{IV} are the same or different and each is a straight or branched alkyl group having from 1 to 12 carbon atoms or R^{III} and R^{IV} together with the carbon atom to which they are each attached from a cycloalkyl group having from 5 to 12 carbon atoms, Y is a straight- or branched alkyl group having from 1 to 12 carbon atoms, an alkenyl group having from 3 to 12 carbon atoms or an aralkyl group having from 7 to 12 carbon atoms and R_{12} is hydrogen or a saturated or unsaturated hydrocarbyl group containing up to 20 carbon atoms optionally substituted, Y halogen or alkoxy having from 1 to 4 carbon atoms and *q* is 2; and a salt thereof selected from a phosphate, carbonate, sulfate, chloride, acetate, stearate, maleate, citrate, tertrate, oxolate, benzoate and substituted carbamate.

2. A compound as claimed in claim 1 wherein R_{12} is an aliphatic group having from 1 to 20 carbon atoms, an alicyclic group having from 5 to 15 carbon atoms or an aromatic group having from 6 to 15 carbon atoms.

4,021,433
DERIVATIVE OF NICOTINIC ACID WITH AMIDES

Claudio Cavazza, Rome, Italy, assignor to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A., Italy

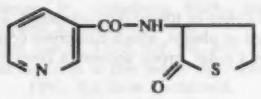
Continuation-in-part of Ser. No. 451,694, March 15, 1974, abandoned. This application Mar. 19, 1976, Ser. No. 668,498
Int. Cl.² C07D *213/56*
U.S. Cl. 260—294.8 D 1 Claim



EFFECT OF ST_{22}^{*} ON LIPID MOBILISATION, 196 MG/KG OS, IN 17-HOUR FASTED RATS (10 PER GROUP). PLASMA AVERAGE VALUES ± S.E.M. (PER CENT OF VALUES IN CONTROLS (FFA 1119±69, TRIGLYCERIDES 93±9) VS HOURS AFTER ADMINISTRATION. FFA (——), TRIGLYCERIDES (- - - -). ○, ●, △ AND ▲ INDICATE NON-SIGNIFICANT DIFFERENCE, P< .05, P< .01 AND P< .001 SIGNIFICANT DIFFERENCE RESPECTIVELY.

* HOMO-CYSTEINE THIOLACTONE NICOTINAMIDE

1. The compound homocysteine thiolactone nicotinamide:



and the non-toxic, pharmacologically acceptable salts thereof.

4,021,434
SODIUM β-[2,6-DIMETHYL-3,5-BIS(ETHOXYCARBONAL)-4-(3-NITROPHENYL)-1,4-DIHYDROPYRIDINE-1-YL]ETHYL SULFATE

Masuo Murakami; Kozo Takahashi, both of Tokyo; Teruaki Ozasa, Ageo; Kazuharu Tamazawa; Ryutaro Kawai, both of Saitama; Toichi Takenaka, Tokyo, and Norio Sato, Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

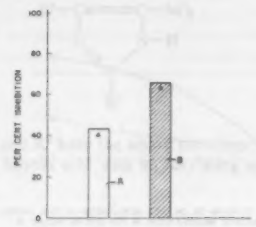
Continuation-in-part of Ser. No. 559,965, May 5, 1975, abandoned, which is a continuation-in-part of Ser. No. 322,848, Jan. 11, 1973, abandoned. This application Aug. 21, 1975, Ser. No. 606,728
Claims priority, application Japan, Jan. 22, 1972, 47-8482; Feb. 24, 1972, 47-18495; July 19, 1972, 47-72373; July 25, 1972, 47-74373
Int. Cl.² C07D *213/55*
U.S. Cl. 260—294.8 R 1 Claim

1. The compound, sodium β-[2,6-dimethyl-3,5-bis(ethoxycarbonyl)-4-(3-nitrophenyl)-1,4-dihydropyridine-1-yl]ethyl sulfate.

4,021,435
DERIVATIVE OF NICOTINIC ACID WITH AMINES

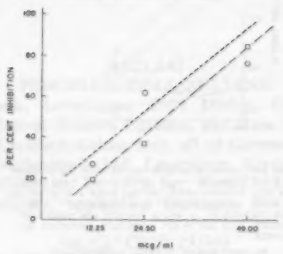
Claudio Cavazza, Rome, Italy, assignor to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A., Italy

Continuation-in-part of Ser. No. 451,696, March 15, 1974, abandoned. This application Mar. 19, 1976, Ser. No. 668,497
Int. Cl.² C07D *213/56*
U.S. Cl. 260—294.8 D 1 Claim



EFFECT OF ST_{41}^{*}, 245 MG/KG S.C., ON LIPID MOBILIZATION IN 17-HOUR FASTED RATS (A) AND IN NOR-ADRENALINE 1 MG/1 ML/KG S.C. TREATED RATS (B). RATE ± E.S.M. OF FAST INDUCED LIPOLYSIS WAS 907±72 μEq/L RATE ± E.S.M. OF NOR-ADRENALINE INDUCED LIPOLYSIS WAS 804±32 μEq/L (10 PER GROUP). STUDENT'S "t" TEST VS CONTROLS. △ INDICATE A P< .001 SIGNIFICANT DIFFERENCE.

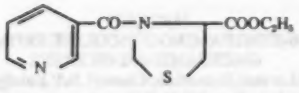
* THIAZOLIDIDE 4-CARBOXYLIC ETHYL ESTHER OF NICOTINIC ACID



EFFECT OF ST_{42}^{*} ON NOR-ADRENALINE □——□ (0.15 MCG/ML) AND 3'5' AMPc ○- - - - - ○ (176.6 MCG/ML) STIMULATED LIPOLYSIS IN ISOLATED RAT EPIDIDYMAL ADIPOSE TISSUE. RATE ± E.S.M. OF NOR-ADRENALINE INDUCED LIPOLYSIS: 5.36±0.28 μEq/HOUR OF TISSUE, RATE ± E.S.M. OF 3'5' AMPc INDUCED LIPOLYSIS WAS 39±3 μEq/gr/3 HOURS

* THIAZOLIDIDE 4-CARBOXYLIC ETHYL ESTHER OF NICOTINIC ACID

1. The compound: Thiazolidide-4-carboxylic ethyl ester of nicotinic acid having the formula:

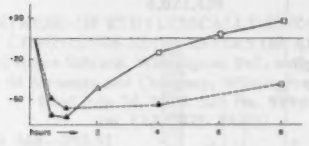


and the non-toxic, pharmacologically acceptable salts thereof.

4,021,436
DERIVATIVES OF NICOTINIC ACID WITH AMINES VARIOUSLY SUBSTITUTED

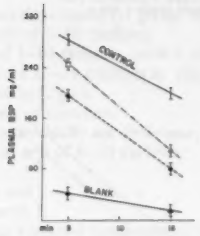
Claudio Cavazza, Via Marocco, 35, Rome, Italy

Continuation-in-part of Ser. No. 451,695, March 15, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,223
Int. Cl.² C07D *213/56*
U.S. Cl. 260—294.8 E 1 Claim



EFFECT OF ST_9, 117 MG/KG OS, ON LIPID MOBILIZATION IN 17-H FASTED RATS. PLASMA AVERAGE VALUES ± S.E.M. IN PER CENT OF VALUES IN CONTROLS (F.F.A. 1001 ± 82.45 μEq/L, TRIGLYCERIDES 40.93 ± 3.14 MG/100 ML) AT DIFFERENT TIMES AFTER ADMINISTRATION. F.F.A. (—) TRIGLYCERIDES (----). ○, △, AND ▲ INDICATE NON SIGNIFICANT DIFFERENCE, P=.01, AND P=.001, SIGNIFICANT DIFFERENCE RESPECTIVELY. N=10 PER GROUP.

ST_9 = NICOTINAMIDE-N-ETHYL-THIONICOTINATE



PLASMA BSP CLEARANCE IN RATS TREATED WITH ST_9, 117 MG/KG (——) AND 233 MG/KG (------) OS 1-H BEFORE, 7 AND 23-H AFTER CCl_4. N=10 PER GROUP. BSP WAS GIVEN 3-H AFTER LAST DOSE OF ST_9. AVERAGE VALUES ± S.E.M. STUDENT'S "t" TEST VERSUS CONTROLS. □, △ AND ▲ INDICATE NON SIGNIFICANT DIFFERENCE, P=.01 AND P=.001, SIGNIFICANT DIFFERENCE RESPECTIVELY.

ST_9 = NICOTINAMIDE-N-ETHYL-THIONICOTINATE

1. The compound Nicotinamide-N-ethyl-thionicotinate and the non-toxic acid addition salts thereof.

4,021,437
6-ETHYLAMINO-2-PICOLINE FROM 6-ACETAMIDO-2-PICOLINE

Roman R. Lorenz, Rensselaer County, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Mar. 15, 1976, Ser. No. 667,136
Int. Cl.² C07D *213/24*
U.S. Cl. 260—296 R 14 Claims

1. In a process for producing 6-ethylamino-2-picoline by reduction of 6-acetamido-2-picoline, the improvement which comprises reacting 6-acetamido-2-picoline with diborane in an inert non-polar solvent at about 0° to 70° C. to produce 6-ethylamino-2-picoline.

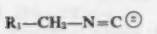
4,021,438
NOVEL PROCESS FOR THE PREPARATION OF THIAZOLES

George D. Hartman, Plainsboro, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

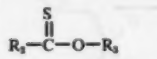
Filed Oct. 22, 1975, Ser. No. 624,796
Int. Cl.² C07D *277/38*, *277/34*
U.S. Cl. 260—302 R 9 Claims

1. A process for the preparation of a compound having the formula:

wherein R_1 is cyano or loweralkoxycarbonyl, and R_2 is hydrogen, loweralkyl or phenyl, which comprises combining at from 0° to 20° C in a polar, protic solvent, a compound having the formula:



with a compound having the formula:



wherein R_1 and R_2 are as previously defined and R_3 is loweralkyl or phenyl in the presence of a base, and then raising the temperature to from 20° C to the reflux temperature or to 100° C for from ½ hour to 3 days.

4,021,439
1-(5-TRIFLUOROMETHYL-1,3,4-THIADIAZOL-2-YL)-3-METHYL-5-ACETYLOXY-1,3-IMIDAZOLIDIN-2-ONE

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Apr. 30, 1975, Ser. No. 573,188
Int. Cl.² C07D *417/00*
U.S. Cl. 260—306.8 D 1 Claim

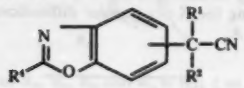
1. The compound 1-(5-trifluoromethyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-acetyloxy-1,3-imidazolidin-2-one.

4,021,440
CYANOMETHYL SUBSTITUTED BENZOXAZOLES

Delme Evans, Chalfont St. Peter; David William Dunwell, Camberley, and Terence Alan Hicks, Farnborough, all of England, assignors to Eli Lilly Industries Limited, London, England

Division of Ser. No. 356,251, May 5, 1973, Pat. No. 3,912,748. This application June 17, 1975, Ser. No. 587,757
Claims priority, application United Kingdom, May 18, 1972, 23409/72
Int. Cl.² C07D *263/56*
U.S. Cl. 260—307 D 2 Claims

1. A compound of the formula:



wherein the group —CR^1R^2-CN is in the 5- or 6-position of the benzoxazole nucleus, R^1 is hydrogen or methyl, R^2 is hydrogen and R^4 represents a phenyl group optionally substituted by one or two groups selected from halogen, trifluoromethyl, methyl, methoxy, nitro or hydroxy.

4,021,441
1-[(ALLYLAMINO)-METHYL]-6-PHENYL-4H-S-TRIAZOLE [4,3-A][1,4]BENZODIAZEPINES

Jackson B. Hester, Jr., Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 7, 1975, Ser. No. 565,710
The portion of the term of this patent subsequent to July 1, 1992, has been disclaimed.
Int. Cl.² C07D *487/04*
U.S. Cl. 260—308 R 6 Claims

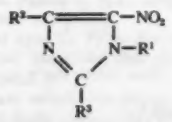
1. 8-Chloro-1-[(allylamino)methyl]-6-phenyl-4H-s-triazolo[4,3a][1,4]benzodiazepine.

4,021,442
PRODUCTION OF 1-ALKYL-5-NITROIMIDAZOLES

Anton Frank; Helmut Karn, both of Ludwigshafen, and Toni Dockner, Meckenheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

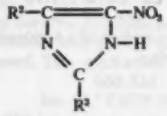
Filed Mar. 11, 1975, Ser. No. 557,270
Claims priority, application Germany, Mar. 25, 1974, 2414280
Int. Cl.² C07D *233/92*
U.S. Cl. 260—309 5 Claims

1. A process for the production of a 1-alkyl-5-nitroimidazole of the formula:

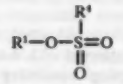

(I)

in which R^1 is an alkyl of 1 to 4 carbons and R^2 and R^3 are identical or different and each is hydrogen or an alkyl of one to 18 carbons, cycloalkyl of five or six carbons, aralkyl of seven to 12 carbons or phenyl, by the reaction of a nitroimidazole with an alkyl ester, wherein

a 5-nitroimidazole of the formula:


(II)

in which R^2 and R^3 have the above meanings is reacted in the presence of formic acid with an alkylating agent of the formula:


(III)

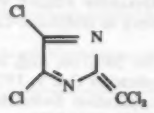
in which R^4 is phenyl or tolyl or the radical —O—R^1 and R^1 has the above meanings at a temperature of from 60° to 80° C.

4,021,443
PERCHLORODIAZAFULVENE

Gunther Beck, Leverkusen; Fritz Düring, Odenthal-Globusch; Helmut Heitzer, Opladen, and Hans Holtschmidt, Bergisch-Gladbach-Kalmuenten, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 29, 1975, Ser. No. 627,154
Claims priority, application Germany, Nov. 15, 1974, 2454326
Int. Cl.² C07D *233/68*
U.S. Cl. 260—309 1 Claim

1. Perchlorodiazafulvene having the formula



4,021,444
2-[5-(3,4-DIMETHOXYPHENYL)-2-FURYL]IMIDAZOLINE HYDROCHLORIDE

Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 10, 1976, Ser. No. 684,722
Int. Cl.² C07D *405/04*
U.S. Cl. 260—309.6 1 Claim

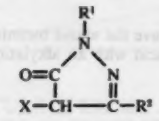
1. The compound 2-[5-(3,4-dimethoxyphenyl-2-furyl-]imidazoline hydrochloride.

4,021,445
PREPARATION OF 4-MONHOHALO-2-PYRAZOLIN-5-ON-COMPOUNDS

Leo August Van Wijnsberghe, 's-Gravenwezel, and Raphaël Karel Van Poucke, Berchem, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 25, 1975, Ser. No. 635,062
Claims priority, application United Kingdom, Dec. 11, 1974, 53616/74
Int. Cl.² C07D 231/16
U.S. Cl. 260—310 A 7 Claims

1. Method for the preparation of a 4-monohalo-2-pyrazolin-5-one having the formula:



wherein:

X is halogen,

R^1 represents C_1–C_{30} alkyl, haloalkyl, cyanoalkyl, benzyl, phenyl or phenyl substituted with one or more members selected from the group consisting of halogen, alkyl, alkoxy, aroxy, alkylthio, alkylsulphonyl, alkylsulphamoyl, haloalkoxy, haloalkylthio and haloalkylsulphonyl, represents (1) anilino or anilino substituted with one or more members selected from the group consisting of halogen, sulpho, nitro, cyano, alkoxy, alkylsulphonyl, alkylthio, acylamino and N-alkylsulphamoyl, and (2) alkyl- or arylcarbonamido or -ureido wherein the alkyl or aryl groups may carry one or more members selected from the group consisting of alkyl, alkoxy, alkylthio, alkylsulphonyl, phenoxy and acylamino,

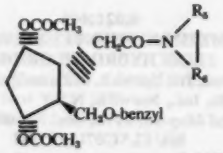
comprising the steps of reaction of a trialkylphosphite with a 4,4-dihalo-2-pyrazolin-5-one carrying in the 1- and 3-positions substituents R^1 and R^2 as defined, and subsequent hydrolysis of the 4-monohalopyrazole-5-enol phosphate ester formed.

4,021,446
4-BENZYLOXYMETHYL-5-[(1-PYRROLIDINYL-CARBONYL)-METHYL]-1,3-CYCLOPENTYLENE-DIACETATE COMPOUNDS

Albert Eduard Fischli, Basel, Switzerland; Michael Josef Klaus, Weil am Rhine, Germany; Hans Johann Mayer, Fullinsdorf, and Alexander Eduard Wick, Riehen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 389,756, Aug. 20, 1973, Pat. No. 3,929,853. This application Oct. 9, 1975, Ser. No. 620,990
Claims priority, application Switzerland, Aug. 28, 1972, 12684/72; July 12, 1973, 10165/73
Int. Cl.² C07D 207/06
U.S. Cl. 260—326.4 2 Claims

1. A compound of the formula



wherein R_5 and R_6 are lower alkyl, which taken together form a pyrrolidinyl ring.

4,021,447
SYNTHESIS OF ZEOLITE ZSM-4

Mae K. Rubin, Bala Cynwyd, Pa.; Charles J. Plank, Woodbury, and Edward J. Rosinski, Pedricktown, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 30, 1975, Ser. No. 572,979
Int. Cl.² C01B 33/28; C07D 295/00
U.S. Cl. 260—326.8 9 Claims

1. A synthetic crystalline aluminosilicate zeolite having a composition as synthesized in terms of moles of oxides as follows:

$$1.0 \pm 0.3\ R_2O : Al_2O_3 : 3\text{-}20\ SiO_2$$

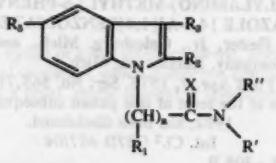
on an anhydrous basis, wherein R is a mixture of alkali metal cations and nitrogen-containing cations derived from a member of the group consisting of choline, choline salts and pyrrolidine and having the X-ray powder diffraction pattern as set forth in Table A.

4,021,448
2-SUBSTITUTED-INDOLE-1-LOWER-ALKANECARBOXAMIDES

Malcolm Rice Bell, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,334
Int. Cl.² C07D 209/04, 209/08, 209/12
U.S. Cl. 260—326.12 R 23 Claims

1. A 2-R_2-3-R_3-5-R_5-1-indole-lower-alkanecarboxamide having the formula:

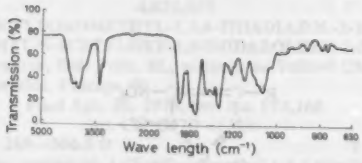


where R′ is hydrogen or methyl; R″ is hydrogen, methyl or $(CH_2)_mOH$, where *m* is 0, 2, or 3; R_1 is hydrogen or methyl; R_2 is methyl ethyl, phenyl or hydroxymethyl; R_3 is methyl, ethyl, hydroxymethyl, trifluoroacetyl or 2,2,2-trifluoro-1-hydroxyethyl; R_5 is hydrogen, chlorine or fluorine; X is O or S; and *n* is 0, 1, 2 or 3, *n* being 0 only when R_5 is chlorine.

4,021,449
DERIVATIVES OF MITOMYCIN C

Yasuo Fujimoto, Tokyo; Kinichi Nakano, and Chikahiro Urakawa, both of Machida, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Japan

Filed Dec. 16, 1974, Ser. No. 532,922
Claims priority, application Japan, Dec. 17, 1973, 48-139579
Int. Cl.² C07D 209/56
U.S. Cl. 260—326.24 4 Claims



1. la-oleoyl mitomycin C.

4,021,450

THIOPHENE DERIVATIVES AND THEIR PREPARATION

Hanns Ahrens; Helmut Biere; Clemens Rufer; Ralph Schmiechen; Eberhard Schroeder; Olaf Loge; Wolfgang Losert, and Ekkehard Schillinger, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

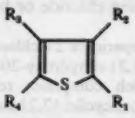
Filed May 20, 1975, Ser. No. 579,196

Claims priority, application Germany, May 21, 1974, 2424740

Int. Cl.² C07D *333/24*

U.S. Cl. 260—332.2 A 11 Claims

1. A thiophene derivative of the formula



wherein one of R_1, R_2, R_3 and R_4 is R_x; 1 or 2 thereof are R_y and the remainder thereof are hydrogen atoms, wherein R_y is alkoxy of 1–6 carbon atoms, and wherein R_x is -S-CH_2-COOH or -S-CH(CH_3)-COOH their enantiomers, and their pharmacologically acceptable salts thereof with bases.

4,021,451

PROCESS FOR PREPARING POLYCYCLIC HETEROCYLES HAVING A PYRAN RING

Thomas A. Dobson; Leslie G. Humber, both of Dollard des Ormeaux; Christopher A. Demerson, St. Laurent, and Ivo L. Jirkovsky, Montreal, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 311,023, Nov. 30, 1972, abandoned, and a continuation-in-part of Ser. No. 289,714, Sept. 15, 1972, Pat. No. 3,939,178, and a continuation-in-part of Ser. No. 148,895, June 1, 1971, Pat. No. 3,843,681. This application June 5, 1975, Ser. No. 584,086

Claims priority, application South Africa,

Int. Cl.² C07D *333/24*

U.S. Cl. 260—332.2 A 1 Claim

1. [p-(3,4-Dihydro-1-methyl-1H-[1]benzothieno[2,3-c]pyran-1-yl)phenyl]-acetic acid.

4,021,452

2,5-DIHYDRO-2,5-DIALKOXYFURAN DERIVATIVES

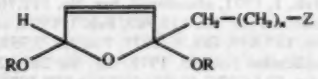
Middleton Brawner Floyd, Jr., Suffern, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 571,041, April 23, 1975, Pat. No. 3,952,033. This application Jan. 29, 1976, Ser. No. 653,671

Int. Cl.² C07D *307/32*

U.S. Cl. 260—347.3 5 Claims

1. A compound of the formula:



wherein *n* is selected from the group consisting of zero and an integer from 1 to 2; R is alkyl having up to 3 carbon atoms; and Z is formyl.

4,021,453

PREPARATION OF EPOXIDES

William F. Brill, Skillman, N.J., assignor to Halcon International, Inc., New York, N.Y.

Filed Apr. 23, 1976, Ser. No. 679,584

Int. Cl.² C07D *301/20*

U.S. Cl. 260—348.5 L 4 Claims

1. The process which comprises oxidizing an olefin by means of an aryl thallic carboxylate in the presence of an inert polar organic solvent for said carboxylate and in the presence of water to produce an epoxide of said olefin.

4,021,454

OLEFIN EPOXIDATION

Harald P. Wulff, Alameda, Calif., and Freddy Wattimena, Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 173,326, Aug. 19, 1971, abandoned, which is a continuation-in-part of Ser. No. 812,920, April 2, 1969, abandoned. This application Apr. 26, 1976, Ser. No. 680,324

Int. Cl.² C07D *301/20*

U.S. Cl. 260—348.5 L 9 Claims

1. A process of epoxidizing allyl chloride by reacting in liquid phase in inert solvent at a temperature of about 25° to 200° C, the allyl chloride with a hydrocarbon hydroperoxide selected from tertiary alkyl hydroperoxide of from 4 to 20 carbon atoms and aralkyl hydroperoxide of from 7 to 20 carbon atoms wherein the hydroperoxy group is on a carbon atom attached directly to an aromatic ring in the presence of a heterogeneous, essentially insoluble catalyst composition comprising an inorganic siliceous solid in chemical combination with at least 0.1% by weight, based on total catalyst composition, of an oxide or hydroxide of titanium.

4,021,455

PROCESS FOR THE MANUFACTURE OF ANTHRAQUINONESULPHONIC ACID

Reinold Schmitz, Blecher, and Christoph M. Wittig, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 22, 1972, Ser. No. 317,767

Claims priority, application Germany, Dec. 22, 1971, 2163674

Int. Cl.² C07C *143/38*

U.S. Cl. 260—370 7 Claims

1. In the process of preparing a solution of anthraquinonesulphonic acid by sulfonating anthraquinone in the presence of mercury-containing catalyst in which a crude undiluted solution containing antraquinone-sulfonic acid and mercury or mercury containing compounds is obtained; the improvement comprising reducing the content of said mercury or mercury compounds in said crude undiluted solution by:

1. treatment of the crude undiluted solution with a sulfur-containing compound selected from the group consisting of P_4S_3, P_4S_5, P_4S_7, P_4S_{10}, thioacetic acid, thioformamide, thiourea, thionenzamide, and 1,3,5-trithiane under conditions effective to form an insoluble mercury compound; and then
2. removing said insoluble mercury compound.

4,021,456

PROCESS FOR THE MANUFACTURE OF AMINOANTHRAQUINONES

Zdenek Seha, Basel, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed May 8, 1975, Ser. No. 575,565

Claims priority, application Switzerland, May 20, 1974, 6883/74

Int. Cl.² C09B *1/16*

U.S. Cl. 260—378 4 Claims

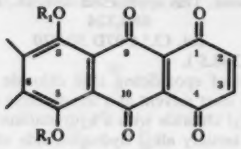
1. A process for the manufacture of 1-aminoanthraquinone and alkyl or halogen substituted 1-aminoanthraquinone, and diaminoanthraquinones, by reduction of 1-nitroanthraquinone and the corresponding alkyl or halogen substituted 1-nitroanthraquinone and dinitroanthraquinones, which process comprises the use of a hydronaphthalene as reducing agent and solvent.

4,021,457
INTERMEDIATES FOR POLYCYCLIC QUINONOID ANTIBIOTICS

Andrew S. Kende, Pittsford; John E. Mills, Rochester, both of N.Y., and Yuh-Geng Tsay, Taichung, China, assignors to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 632,939, Nov. 18, 1975. This application Apr. 5, 1976, Ser. No. 673,513
Int. Cl.² C07C *49/70*
U.S. Cl. 260—383 35 Claims

1. Ethers having the formula



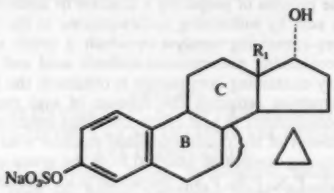
wherein R_1 is a lower alkyl of 1–5 carbon atoms; phenyl- or substituted phenyl-lower alkyl wherein the substituent groups are lower alkyl, lower alkoxy, each containing 1–5 carbon atoms, or halo; and lower alkyl contains 1–5 carbon atoms.

4,021,458
PROCESS FOR THE PREPARATION OF 3-HEMISULFATE-17α-HYDROXY STEROIDS

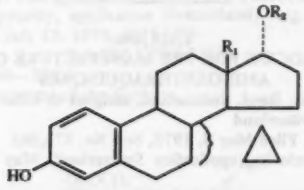
Hanfried Arnold; Jean-Claude Hilscher, and Reinhold Wieske, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Apr. 15, 1975, Ser. No. 568,379
Claims priority, application Germany, Apr. 18, 1974, 2419207
Int. Cl.² C07J *1/00*
U.S. Cl. 260—397.5 10 Claims

1. A process for the production of a 3-hemisulfate sodium salt of a 17α-hydroxy steroid of the formula



wherein R_1 is hydrogen, methyl, or ethyl and Δ is 0 to 3 double bonds in the B and C rings, which comprises treating a corresponding 3-hydroxy-17α-acyloxy steroid of the formula



wherein R_1 and Δ have the values given above and R_2 is the acyl radical of an organic carboxylic acid of up to 15 carbon atoms, or a corresponding steroid having 1–3 double bonds in the B and C rings, with sulfur trioxide in an amine or with a reactive functional derivative of sulfur trioxide capable of transferring sulfur trioxide, in an amine at about 0°–60° C.; and saponifying the reaction product without isolation thereof with an alkaline sodium compound.

4,021,459
PROCESS FOR THE PREPARATION OF 21-HALOGENO-21-DESOXY-17α-ACYLOXY 20-KETO-PREGNENES

Michael J. Green, East Brunswick, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Aug. 14, 1975, Ser. No. 604,673
Int. Cl.² C07J *5/00*
U.S. Cl. 260—397.45 9 Claims

1. The process for the preparation of a 21-halogeno-17α-acyloxy-20-ketopregnene, said halogeno being chloro or bromo, which comprises the reaction of a 17,21-dihydroxy-20-ketopregnene 17,21-orthoester with a triphenylmethyl halide, said halide being chloride or bromide, in an organic solvent.

6. A process for preparing a 21-chloro-17-acyloxy-20-ketopregnene from a 17,21-dihydroxy-20-ketopregnene, cyclic 17,21-orthoester which comprises reacting a 17,21-dihydroxy-20-ketopregnene, cyclic 17,21-orthoester with triphenylmethyl chloride in an organic solvent at the reflux temperature of the solvent.

4,021,460
METHOD FOR MANUFACTURING α-SULFO FATTY ACID ESTER SALT

Toshiaki Ogoshi, Funabashi, and Shizuo Sekiguchi, Yokohama, both of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Oct. 7, 1975, Ser. No. 620,278
Claims priority, application Japan, Oct. 8, 1974, 49-115813
Int. Cl.² C11D *1/28*
U.S. Cl. 260—400 7 Claims

1. A method for the manufacture of α-sulfo fatty acid ester salt which comprises:

sulfonating a mixture of 3 parts by weight of saturated fatty acid alkyl ester having 9 to 26 carbon atoms and 0.5 to 10 parts by weight of inorganic sulfate selected from the group consisting of sodium, calcium, ferric, aluminum and ammonium sulfates with a sulfonating gas containing about 1 to 2 mols of SO_3 per mol of said fatty acid ester diluted to a concentration of between about 3 to 20% by volume with an inert gas,

said sulfonation being conducted at a temperature higher than the solidification point of said fatty acid ester, and

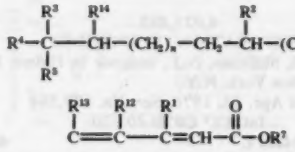
thereafter neutralizing the resulting α-sulfo fatty acid ester with caustic alkali.

4,021,461
ALIPHATIC HYDROCARBON 2,4-DIENOIC ACIDS, ESTERS AND DERIVATIVES THEREOF

Clive A. Henrick, Palo Alto, Calif., assignor to Zoecon Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 201,102, Nov. 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 111,673, Feb. 1, 1971, abandoned, Ser. No. 111,701, Feb. 1, 1971, abandoned, Ser. No. 111,767, Feb. 1, 1971, abandoned, and Ser. No. 187,898, Oct. 8, 1971, Pat. No. 3,752,843. This application June 23, 1972, Ser. No. 265,922
Int. Cl.² C07C *69/61, 69/52;* A01N *9/24*
U.S. Cl. 260—410.9 N 33 Claims

1. A compound selected from those of the following formula:



wherein,

each of m and n is zero or the positive integer one, two or three;
each of R^1 and R^2 is methyl or ethyl; R^4 is lower alkyl of one to six carbon atoms;
each of R^3 and R^5 is hydrogen, methyl or ethyl;
each of R^{12}, R^{13} and R^{14} is hydrogen or methyl; and
R^7 is hydrogen, lower alkyl of one to six carbon atoms, lower alkenyl of three to six carbon atoms, lower alkynyl of three to six carbon atoms, cycloalkyl of three to eight carbon atoms, aryl of six to 12 carbon atoms, aralkyl of seven to 12 carbon atoms or a metal cation selected from thr group consisting of lithium, sodium, potassium, calcium, strontium, copper, manganese and zinc.

4,021,462
ISOLATION OF CARBOXY-SUBSTITUTED ALIPHATIC HYDROCARBONS

Edward J. Dufek, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed July 28, 1975, Ser. No. 599,497
Int. Cl.² C11C *1/00, 1/08*
U.S. Cl. 260—419 **10 Claims**

1. A process for separating carboxy-substituted aliphatic hydrocarbon mixtures into fractions, each fraction having as its predominant component a carboxy-substituted aliphatic hydrocarbon exhibiting a single degree of carboxy substitution, the process comprising the following steps:
   a. serially extracting a solution of said mixture with at least one aliquot of aqueous alkali metal bicarbonate, wherein the amount of alkali metal bicarbonate employed in said aliquot is at most an about 5% to 10% excess over the stoichiometric amount needed to neutralize the carboxy groups of the desired carboxy-substituted aliphatic hydrocarbon fraction;
   b. separating said at least one aliquot from said solution;
   c. acidifying said aliquot; and
   d. recovering said desired carboxy-substituted aliphatic hydrocarbon fraction.

5. A process for separating carboxy-substituted aliphatic hydrocarbon mixtures into fractions, wherein said mixture includes a monocarboxy-substituted aliphatic hydrocarbon, and wherein each fraction has as its predominant component a carboxy-substituted aliphatic hydrocarbon exhibiting a single degree of carboxy substitution, the process comprising the following steps:
   a. serially extracting a solution of said mixture with at least one aliquot of aqueous alkali metal bicarbonate;
   b. separating said at least one aliquot from said solution;
   c. acidifying said aliquot; and
   d. recovering said desired carboxy-substituted aliphatic hydrocarbon fraction.

10. A process for separating lower alkyl polycarboxystearate from lower alkyl monocarboxystearate, said process comprising serially extracting a solution of a mixture of both said lower alkyl polycarboxystearate and said lower alkyl monocarboxystearate with at least one aliquot of an aqueous solution of alkali metal bicarbonate wherein the amount of said bicarbonate in said at least one aliquot is in unknown excess of the stoichiometric amount of bicarbonate needed to neutralize the carboxy groups of said lower alkyl polycarboxystearate, separating said at least one aliquot from said solution, acidifying said aliquot and recovering the lower alkyl polycarboxystearate.

4,021,463
REGENERATION AND SEPARATION OF RHODIUM-CONTAINING OR IRIDIUM-CONTAINING CATALYSTS FROM DISTILLATION RESIDUES FOLLOWING HYDROFORMYLATION

Rudolf Kummer, Frankenthal; Kurt Schwirten, Ludwigshafen, both of Germany; Hans-Dieter Schindler, deceased, late of Frankenthal, Germany; by Maria Elisabeth Schindler; by Ute Lang, both of Neuried, Germany, and by Rainer Schindler, heirs-at-law, Hechendorf, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 24, 1975, Ser. No. 616,448
Claims priority, application Germany, Oct. 9, 1974, 2448005
Int. Cl.² C07F *15/00*
U.S. Cl. 260—429 R **6 Claims**

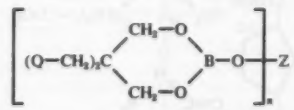
1. A process for regeneration of catalysts of the formula $HMe(CO)(PR_3)_3$, wherein Me denotes rhodium or iridium and R denotes the same or different hydrocarbon radicals, which comprises treating a distillation residue of a rhodium-catalyzed or iridium-catalyzed hydroformylation process with an aqueous mineral acid and a peroxide at 20°–120° C to convert the iridium or rhodium into their respective water soluble salts which pass virtually quantitatively into the aqueous phase, separating said aqueous phase from the distillation residue, destroying the peroxide in said aqueous phase, reacting the iridium or rhodium salts in the separated aqueous phase at 0°–150° bars with carbon monoxide or a carbon monoxide donor, a hydrohalic acid or an alkali metal halide, and a tertiary phosphine PR_3 wherein R has the above meanings in the presence of a water-soluble organic solvent to form the catalyst $Me(CO)(PR_3)_2Hal$, in which Me and R have the above meanings and Hal denotes chlorine, bromine or iodine, which catalyst precipitates in the reaction mixture, and hydrogenating the reaction mixture or said catalyst $Me(CO)(PR_3)_2$. Hal produced therein to produce the catalyst $HMe(CO)(PR_3)_3$.

4,021,464
BORIC ACID ESTERS

Horst Mayerhoefer, Oberwil; Wolfgang Müeller, Neuallschwil, and Urs Sollberger, Follinsdorf, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Division of Ser. No. 276,395, July 31, 1972, Pat. No. 3,907,857. This application Mar. 7, 1975, Ser. No. 556,303
Claims priority, application Switzerland, Aug. 5, 1971, 11525/71; Dec. 17, 1971, 18432/71
Int. Cl.² C07F *5/04*
U.S. Cl. 260—462 R **15 Claims**

1. A compound of the formula



in which
each Q is, independently, chloro or bromo
n is 1, 2, 3 or 4, and
Z is selected from the group consisting of n-valent hydrocarbon groups of up to 20 carbon atoms which consist of aromatic and/or saturated aliphatic units, which may be interrupted once or twice by an oxygen or sulphur atom, the imino group or by an alkylimino group of 1 to 6 carbon atoms, and which may be unsubstituted or substituted by one or more bromine or chlorine atoms or hydroxyl or amino groups.

4,021,465
UNSATURATED DINITRILE PREPARATION

George B. Fozzard, and John R. Norell, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 13, 1976, Ser. No. 648,709
Int. Cl.² C07C *120/00*
U.S. Cl. 260—465.8 R 10 Claims

1. In a process for preparing unsaturated dinitriles comprising reacting an olefin hydrocarbon having from 3 to 12 carbon atoms with 1 to 2 ethylenically unsaturated, non-conjugated double bonds, an unsaturated mononitrile having from 3 to 10 carbon atoms per molecule and being represented by the formula RCH=CR—CN wherein each R is independently selected from alkyl, cycloalkyl, and aryl hydrocarbyl radicals and combinations thereof and hydrogen, and a monoadduct reaction product of an olefin and an unsaturated mononitrile, as defined above, separating the effluent from said reacting into a product stream comprising unsaturated dinitrile reaction product and a stream comprising monoadduct reaction product for recycle to said reacting, the improvement for minimizing the buildup of internally unsaturated monoadduct recycled to said reacting which comprises subjecting at least a portion of the monoadduct reaction product recycle stream to pyrolysis conditions including an elevated temperature and a period of time sufficient to cause decomposition of said monoadduct and form olefin and unsaturated mononitrile, as defined above, and passing olefin and unsaturated mononitrile thus formed to said reacting.

4,021,466
CYCLOPROPANE CARBOXYLATES

Royston H. Davis, Rainham, and Robert J. G. Searle, Rodmersham Green, both of England, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 510,197, Sept. 30, 1974, Pat. No. 3,950,535. This application Aug. 25, 1975, Ser. No. 607,396
Claims priority, application United Kingdom, Oct. 8, 1973, 46926/73
Int. Cl.² C07C *69/74*
U.S. Cl. 260—468 G 5 Claims

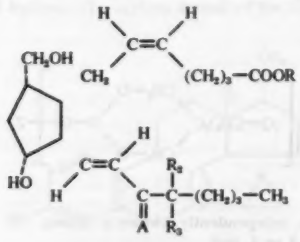
1. 3-Phenoxybenzyl 2,2-dimethyl-3-spirocyclobutanecyclopropane carboxylate.

4,021,467
9-DEOXY-9α-HYDROXYMETHYL-PGF$_2$ ANALOGS

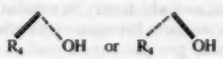
Gordon L. Bundy, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 556,768, March 10, 1975, Pat. No. 3,950,363. This application Jan. 23, 1976, Ser. No. 651,622
Int. Cl.² C07C *177/00*
U.S. Cl. 260—468 D 10 Claims

1. A compound of the formula



wherein R is hydrogen, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation;
wherein R_2 and R_3 are hydrogen, methyl or ethyl; and
wherein A is



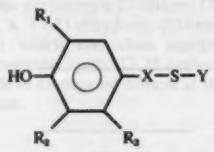
wherein R_4 is hydrogen, methyl, or ethyl, with the proviso that R_4 is methyl or ethyl only when R_2 and R_3 are both hydrogen.

4,021,468
THIAALKYL PHENOLS

Hanns Lind, Liestal, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 394,957, Sept. 6, 1973, abandoned. This application June 23, 1975, Ser. No. 589,657
Int. Cl.² C07C *149/40*
U.S. Cl. 260—470 5 Claims

1. A compound of the formula



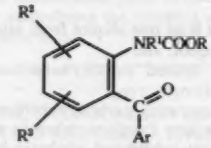
Wherein R_1 and R_2 are tert-butyl, R_3 is hydrogen or methyl, X is alkylene with 3 to 18 carbon atoms, with the phenol radical and the sulphur atom being separated by 2 or 3 carbon atoms and Y is alkoxy carbonylalkyl with 3 to 21 carbon atoms or carboxyalkyl with 2 or 3 carbon atoms.

4,021,469
PROCESS FOR PREPARING N-PHENYLCARBAMATES

George Oliver Weston, Havant, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

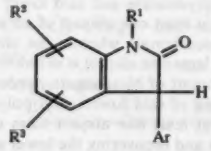
Filed Nov. 24, 1975, Ser. No. 634,566
Claims priority, application United Kingdom, Dec. 3, 1974, 52244/74
Int. Cl.² C07C *125/06;* C07D *213/50, 307/46, 333/22*
U.S. Cl. 260—471 C 7 Claims

1. A process for preparing a compound of general formula:



(I)

wherein R represents lower alkyl or aralkyl of 7 to 10 carbon atoms; R^1 represents hydrogen or a lower alkyl group; R^2 and R^3 independently represent hydrogen, halogen, lower alkyl, lower alkoxy, nitro, lower alkylsulphonyl, lower alkylthio or trifluoromethyl; and when taken together R^2 and R^3 represent methylenedioxy; and Ar represents a carbocyclic aryl radical of 6 to 10 carbon atoms, or a pyridyl, thienyl, or furyl radical, which radicals may be substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, or methylthio; which comprises reacting in a polar solvent a compound having the general formula:



(II)

wherein R^1, R^2, R^3 and Ar are as hereinbefore defined, with oxygen in the presence of an alkali metal alkoxide or aralkoxide having the formula:

$$RO^- M^+ \quad \text{(III)}$$

wherein R represents lower alkyl, or aralkyl of 7 to 10 carbon atoms and M^+ represents an alkali metal cation.

4,021,470
2,2,4-TRIMETHYLPENTYL-N-NAPHTHYL ANTHRANILATE

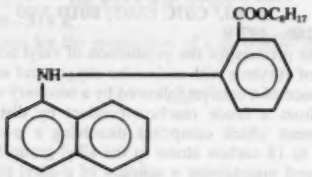
Milton Braid, Westmont, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 337,185, March 1, 1973, Pat. No. 3,856,690, which is a continuation-in-part of Ser. No. 126,891, March 22, 1971, abandoned. This application Oct. 30, 1974, Ser. No. 519,368

Int. Cl.² C07C *101/54*

U.S. Cl. 260—471 R **1 Claim**

1. A compound of the formula



wherein C_8H_{17} is 2,2,4-trimethylpentyl.

4,021,471
FORMAMIDINES USEFUL AS ULTRAVIOLET LIGHT ABSORBERS

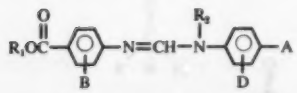
Joseph A. Virgillo, Wayne, and Milton Manowitz, Fairlawn, both of N.J., assignors to Givaudan Corporation, Clifton, N.J.

Filed Apr. 18, 1974, Ser. No. 462,051

Int. Cl.² C07C *101/68*

U.S. Cl. 260—471 R **16 Claims**

1. A compound of the formula:



wherein:

R_1 is selected from the group consisting of alkyl radicals of from one to five carbon atoms;

B is selected from the group consisting of H, OH, Cl and methoxy;

R_2 is selected from the group consisting of alkyl radicals from one to nine carbon atoms and a phenyl radical;

A is selected from the group consisting of H, carboethoxy, carbobutoxy, methoxy, ethyl, dimethylamino and chlorine;

D is selected from the group consisting of H, OCH_3, Cl.

4,021,472
GUANIDINOBENZOIC ACID DERIVATIVES

Setsuro Fujii, Tokushima; Yoshiaki Uegai, Ibaraki; Tsuyoshi Watanabe, Kadoma, and Naohiro Kayama, Takatsuki, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

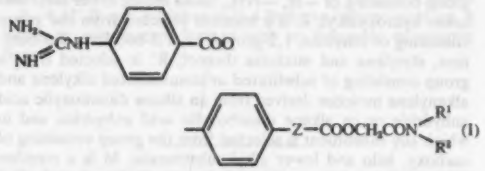
Filed Nov. 3, 1975, Ser. No. 628,676

Claims priority, application Japan, Nov. 1, 1974, 49-125499; Dec. 17, 1974, 49-144103; May 27, 1975, 50-62519

Int. Cl.² C07C *129/12*

U.S. Cl. 260—472 **6 Claims**

1. N-substituted guanidinobenzoic acid derivatives represented by the formula



wherein R^1 and R^2 may be the same or different and each represents a hydrogen atom or a lower alkyl group having 1 to 3 carbon atoms, and Z represents a methylene group, an ethylene group, or a vinylene group, and pharmaceutically acceptable acid addition salts thereof.

4,021,473
OPTICALLY ACTIVE N,N''-DIALKYL-N,N'-BIS(1-HYDROXYBUTYL-2-)ETHYLENEDIAMINE ESTERS AND THE SALTS THEREOF

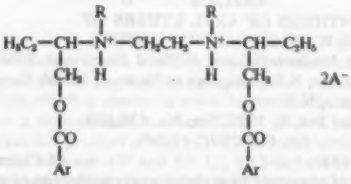
Marian Eckstein; Jerzy May; Eleonora Herdegen, and Daniel Kulig, all of Krakow, Poland, assignors to Krakowskie Zaklady Farmaceuticzne "Polfa", Krakow, Poland

Filed Oct. 22, 1974, Ser. No. 517,064

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 R **9 Claims**

1. A salt of an optically active ester of N,N'-dialkyl-N,N'-(bis-1-hydroxy-2-butyl) ethylenediamine of the formula:



wherein the R groups may be the same or different and R denotes a C_nH_{2n+1} group wherein $n = 1–4$;

Ar denotes a phenyl group which is substituted in positions 3,4 by $—OCH_3$, $—OC_2H_5$, or $—OCH_2O—$ groups or in positions 3,4,5, by $—OCH_3$ or $—OC_2H_5$ groups; and

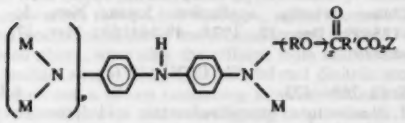
A denotes the anion of a hydrohalic acid, sulfuric acid, an aryl or alkyl carboxylic or sulfonic acid, wherein the aryl group is phenyl o-or p-tolyl, o-or p-hydroxyphenyl, o-or p-aminophenyl or naphthyl and the alkyl group has from 1 to 4 carbon atoms.

4,021,474
ANTIDEGRADANT ESTERS

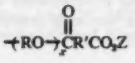
Joseph A. Pawlak, Buffalo, and Francis J. Bajer, Depew, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 457,331, April 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 319,101, Dec. 27, 1972, abandoned, which is a continuation-in-part of Ser. No. 155,297, June 21, 1971, abandoned. This application Dec. 30, 1974, Ser. No. 537,472
Int. Cl.² C07C *93/26*
U.S. Cl. 260—485 G 16 Claims

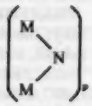
1. A compound of the formula



wherein X is from 1 to 12; Z is a member selected from the group consisting of —H, —NH_4, alkali metal, lower alkyl and lower hydroxyalkyl; R is a member selected from the group consisting of ethylene, 1,2-propylene, 1,2-butylene, 2,3-butylene, styrylene and mixtures thereof; R′ is selected from a group consisting of substituted or unsubstituted alkylene and alkenylene moieties derived from an alkane dicarboxylic acid anhydride or an alkene dicarboxylic acid anhydride and in which any substituent is selected from the group consisting of carboxy, halo and lower alkyl substituents; M is a member selected from the group consisting of alkyl and cycloalkyl hydrocarbon of up to 20 carbon atoms (RO)—$_x$H, and



wherein R, X, R′ and Z are as above defined; and P is an integer from 0 – 1, providing when *p* is o,



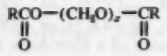
is hydrogen.

4,021,475
SYNTHESIS OF ARYL ETHERS OF BIS(HYDROXYMETHYL) ETHER

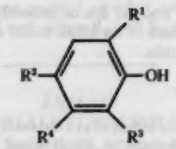
Donald Harold Wadsworth, and Richard Sturtevant Vinal, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1975, Ser. No. 638,009
Int. Cl.² C07C *41/00*
U.S. Cl. 260—491 14 Claims

1. A process of preparing an arylaryloxyoxymethylene or an acylaryloxyoxymethylene comprising heating a mixture of an ester having the formula:



wherein *x* has the values 2 or 3 and R represents a lower alkyl group of 1 to 4 carbon atoms and a phenol having the formula:



wherein R^1, R^2, R^3 and R^4 are each independently H, halogen, methoxy, phenyl and alkyl having 1 to 18 carbon atoms, to at least the boiling point of free monocarboxylic acid having the formula RCOOH, at which temperature the ester and phenol react to form said arylaryloxyoxymethylene or acylaryloxyoxymethylene and RCOOH and removing said RCOOH from said mixture.

4,021,476
VINYL ACETATE POLYMERIZATION INHIBITORS

Linda Ann Harbuck, Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,842
Int. Cl.² C07C *67/05*; B01D *3/00*
U.S. Cl. 260—497 R 3 Claims

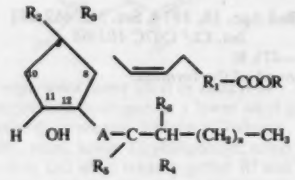
1. In the process for the production of vinyl acetate by the reaction of ethylene with molecular oxygen and acetic acid in the presence of a catalyst followed by a recovery of pure vinyl acetate from a crude reaction product by distillation, the improvement which comprises dissolving a p-alkyl phenol having 4 to 18 carbon atoms in the alkyl group in the crude product and maintaining a solution of p-alkyl phenol in the vinyl acetate through all distillation stages.

4,021,477
14-CHLORO PROSTADIENOIC ACID COMPOUNDS

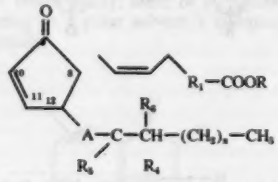
Carmelo Gandolfi; Gianfederico Doria, both of Milan, and Pietro Gaio, Lamon (Belluno), all of Italy, assignors to Carlo-Erba S.p.A., Milan, Italy

Continuation of Ser. No. 346,249, March 30, 1973, Pat. No. 3,935,254. This application Nov. 13, 1975, Ser. No. 631,655
Claims priority, application Italy, Apr. 13, 1972, 23063/72; Apr. 28, 1972, 23662/72
Int. Cl.² C07C *177/00*
U.S. Cl. 260—514 D 4 Claims

1. A compound of the formula:



(I)

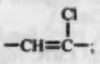


(II)

and the racemates thereof, wherein:

R is hydrogen, a pharmaceutically acceptable cation, a C_{1-12} alkyl group or a trichloroethyl group;

R_1 is $-CH_2CH_2-$, $-OCH_2-$, $-SCH_2-$, $-CH=CH-$ or $-C\equiv C-$;
one of R_2 and R_3 is hydrogen and the other is a hydroxy group, or R_2 and R_3 together form an oxo group;
A is



one of R_4 and R_5 is hydrogen and the other is a hydroxy group;
R_6 is hydrogen or a C_{1-14} alkyl group; n is 3 or 4;
and wherein the chains bound to the carbon atoms in the 8 position and in the 12 position are in the transconfiguration.

4,021,478

PREPARATION OF CARBOXYLIC ACIDS FROM GLYCIDONITRILES WITH IONIC LEWIS ACIDS

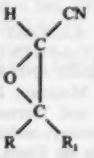
David R. White, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 531,671, Dec. 10, 1974, abandoned, and a continuation-in-part of Ser. No. 271,389, July 13, 1972, abandoned. This application Apr. 23, 1976, Ser. No. 680,002
Int. Cl.² C07C *51/00*
U.S. Cl. 260—515 R **4 Claims**

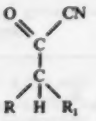
1. A process for the production of a carboxylic acid of the formula:

wherein R when taken separately represents hydrogen or an aliphatic, alicyclic, aromatic or heterocyclic group and R_1 when taken separately represents an aliphatic, alicyclic, aromatic or heterocyclic group; and R and R_1 when taken together and connected represents an alicyclic or heterocyclic group, which comprises:

1. treating a glycidonitrile of the formula:



wherein R and R_1 have the meanings given, above, with an ionic Lewis acid selected from the group consisting of lithium perchlorate, lithium trifluoroacetate, lithium tetrafluoroborate, lithium sulfate or potassium bisulfate to obtain a 2-oxopropionitrile of the formula:



wherein R and R_1 have the meanings given, above;

2. subjecting the 2-oxopropionitrile so obtained to hydrolysis with an aqueous alkali metal base to obtain an alkali metal salt of a carboxylic acid of the formula:

wherein R and R_1 have the meanings given, above, and M^+ is selected from the group consisting of sodium, potassium and lithium, and

3. acidifying the alkali metal salt of the carboxylic acid so obtained with a strong acid to obtain the corresponding free carboxylic acid.

4,021,479

DERIVATIVES OF 4-(4-BIPHENYLYL)-BUTYRIC ACID

Ernst Seeger; Wolfhard Engel; Josef Nickl, and Helmut Teufel, all of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 234,346, March 13, 1972, abandoned. This application Oct. 15, 1973, Ser. No. 406,196
Claims priority, application Germany, Mar. 17, 1971, 2112716; Mar. 17, 1971, 2112715; Mar. 17, 1971, 2112840
Int. Cl.² C07C *63/333*, *65/14*
U.S. Cl. 260—520 B **1 Claim**

1. 4-(2′-fluoro-4-biphenylyl)-4-hydroxy-butyric acid or a non-toxic salt thereof formed with an inorganic or organic base.

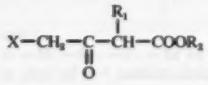
4,021,480

PROCESS FOR THE PRODUCTION OF CARNITINE

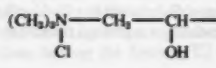
Leander Tenud, Visp, Wallis, Switzerland, ass'gnor to Lonza Ltd., Gampel, Switzerland

Filed Sept. 25, 1975, Ser. No. 616,848
Claims priority, application Switzerland, Sept. 25, 1974, 12970/74
Int. Cl.² C07C *99/00*
U.S. Cl. 260—534 M **14 Claims**

1. The process for the production of carnitine hydrochloride which comprises (a) reacting an ester of γ-haloacetoacetic acid having the formula:



wherein R_1 is hydrogen, R_2 is a lower alkyl group having 1 to 10 carbon atoms and X is a halogen atom selected from the group consisting of chlorine or bromine, with an alkali alcoholate, which is present in a stoichiometrically excessive amount, at a temperature between 0° and −40° C; (b) reacting the reaction product of step (a) with trimethylamine at a temperature between 10° and 50° C., a (3-carbalkoxy-2-oxopropyl)-trimethyl ammonium halide resulting; (c) catalytically hydrogenating said (3-carbalkoxy-2-oxopropyl)-trimethyl ammonium halide, a carnitine ester resulting; and (d) converting said carnitine ester by means of aqueous hydrochloride acid into said carnitine hydrochloride, which has the formula:



4,021,481
AMIDO DERIVATIVES OF 2,4,6-TRIIODOBENZOIC ACIDS CONTAINING AT LEAST ONE N-HYDROXYALKYL AND AT LEAST TWO HYDROXYL GROUPS

Torsten Almen; Johan Haavaldsen, and Vegard Nordal, all of Oslo, Norway, assignors to Nyegaard & Co. A/S, Oslo, Norway

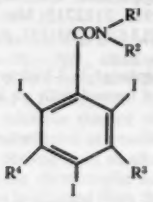
Continuation of Ser. No. 301,101, Oct. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 50,075, June 26, 1970, Pat. No. 3,701,771. This application Dec. 2, 1974, Ser. No. 528,842

Claims priority, application United Kingdom, June 27, 1969, 32699/69; Feb. 9, 1970, 6130/70

Int. Cl.² C07C *103/26;* A61K *29/02*

U.S. Cl. 260—558 A 9 Claims

1. A non-ionic X-ray contrast compound of the formula



where R^1 and R^2, which may be the same or different, are each a hydrogen atom, an alkyl group, a hydroxylalkyl group or an alkanoyloxyalkyl group and R_3 and R^4, which may be the same or different, are each a group of the formula $—NR^5Ac$, where R^5 is a hydrogen atom, an alkyl group, a hydroxyalkyl group, an alkanoyloxyalkyl group or an alkanoyl group and Ac is an alkanoyl group; a group of the formula $—CH_2NR^5Ac$, where R^5 and Ac have the above meanings; or a group

as defined above; each alkyl, hydroxyalkyl or alkanoyl group which is present having up to 6 carbon atoms there being at least one N-hydroxyalkyl and at least two hydroxyl groups in the molecule.

4,021,482
SULFINYL OR SULFONYL-1-CHLOROACRYLIC ACID AMIDES

Heinrich Schempp, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed July 25, 1974, Ser. No. 491,724

Claims priority, application Switzerland, Aug. 2, 1973, 11227/73

Int. Cl.² C07C *143/16, 145/02*

U.S. Cl. 260—561 S 6 Claims

1. Chloroacrylic acid amide derivative of formula Ia

$$CH_3—S(O)_x—CH=CCl—CONHR_2' \quad (Ia)$$

wherein X represents 1 or 2, and R_2' stands for C_3-C_4-alkyl, or for an unsubstituted phenyl radical or a phenyl radical at most di-substituted with Cl, Br or CF_3.

4,021,483
2-CHLORO-N-ISOPROPYL-2',3'-DIMETHYLACETANILIDE AS A HERBICIDAL AGENT

Albert William Lutz, Princeton, and Robert Eugene Diehl, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 25, 1975, Ser. No. 599,235

Int. Cl.² C07C *103/375*

U.S. Cl. 260—562 B 1 Claim

1. The compound: 2-chloro-N-isopropyl-2',3'-dimethylacetanilide.

4,021,484
NOVEL CATIONIC AMINO RESINS AND PROCESSES FOR PRODUCING THE SAME

Hiromi Toda, Daito; Kametaro Kunimori, Neyagawa, and Kuniaki Tsumori, Osaka, all of Japan, assignors to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed July 10, 1974, Ser. No. 487,181

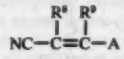
Int. Cl.² C07C *87/30*

U.S. Cl. 260—567.6 P 11 Claims

1. A product of the process for producing a cationic amino resin characterized by subjecting to thermal polymerization for 30 minutes to 30 hours at a temperature of 170° to 300° C.

1. an alicyclic conjugated polyene compound having an alicyclic ring of 5 to 7 carbon atoms, and

2. an α,β-ethylenically unsaturated nitrile of the formula



wherein R^8 and R^9 are each hydrogen or methyl, and A is H or CN, to prepare a copolymer containing a nitrile group, there being 0.5 to 20 moles of said polyene compound per mole of said unsaturated nitrile, and hydrogenating said copolymer to reduce said nitrile group, said resin having a weight average molecular weight of 400 to 10,000 and an amine value of 20 to 700.

4,021,485
N,N'-BIS-[(β-HYDROXY-β-PHENYL)-ETHYL]-POLYMETHYLENEDIAMINES AND SALTS THEREOF

Kurt Schromm; Anton Mentrup; Ernst-Otto Renth, all of Ingelheim am Rhein, and Werner Traunecker, Munster-Sarmsheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

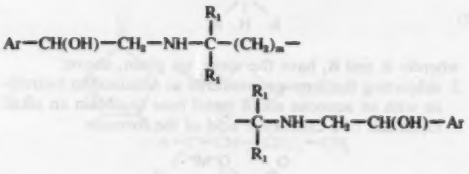
Continuation of Ser. No. 246,711, April 24, 1972, abandoned. This application Nov. 4, 1975, Ser. No. 628,819

Claims priority, application Austria, Apr. 26, 1971, 3582/71

Int. Cl.² C07C *91/16*

U.S. Cl. 260—570.6 7 Claims

1. A compound of the formula



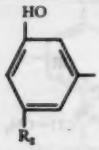
wherein

R_1 is hydrogen or methyl,

m is 0 or an integer from 1 to 8, inclusive, and

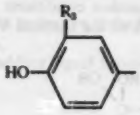
Ar is

-Continued



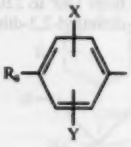
where R_2 is hydrogen or hydroxyl,

(b)



where R_3 is hydroxy-lower alkyl, or

(c)



where
R_6 is hydrogen, amino or hydroxyl,
X is chlorine or bromine, and
Y is hydrogen, chlorine or bromine
or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,021,486

HYDROXYALKYL-AMINO NITRODIPHENYLAMINE COMPOUNDS USEFUL AS HAIR DYES

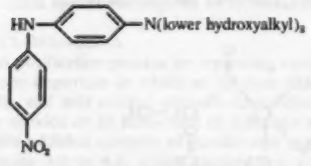
Alexander Halasz, Norwalk, and David Cohen, Stamford, both of Conn., assignors to Clairol Incorporated, New York, N.Y.

Division of Ser. No. 318,293, Dec. 26, 1972, Pat. No. 3,950,127. This application Jan. 14, 1975, Ser. No. 540,780

Int. Cl.² C07C *91/40*; A61K *7/13*

U.S. Cl. 260—573 **5 Claims**

1. A compound useful for a hair dye of the formula:



wherein said hydroxyalkyl groups have 2 to 4 carbon atoms and 1 to 3 hydroxy groups.

4,021,487

PREPARATION OF m-AMINO-α-METHYLBENZYL ALCOHOL

William Michalowicz, Lock Haven, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Filed May 24, 1974, Ser. No. 473,229

Int. Cl.² C07C *85/11*

U.S. Cl. 260—580 **4 Claims**

1. A process for producing m-amino-α-methylbenzyl alcohol from m-nitroacetophenone in a single step process comprising hydrogenating m-nitroacetophenone in a highly acidic aqueous reaction system consisting essentially of water, a mineral acid and a catalytic amount of a 5% palladium on carbon catalyst, the molar ratio of acid to m-nitroacetophenone being from 1:2 to 2:1; said hydrogenation being carried out at a temperature of less than about 50° C and at a hydrogen pressure of from 25 psi to about 1000 psi.

4,021,488

1-ACETYL-3,3-DIMETHYL-(2-PROPENYL)CYCLOHEXANE

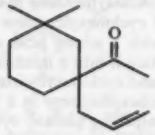
John B. Hall, Rumson; Mark A. Sprecker, Sea Bright; Frederick Louis Schmitt, Holmdel, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Aug. 11, 1976, Ser. No. 713,429

Int. Cl.² C07C *49/61*

U.S. Cl. 260—586 R **1 Claim**

1. The compound 1-acetyl-3,3-dimethyl-(2-propenyl) cyclohexane having the structure:



4,021,489

REACTION OF SULFUR TRIOXIDE WITH CYCLIC (4- AND 5-MEMBERED RING) FLUOROVINYLETHERS

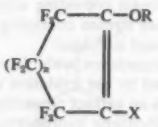
Carl George Krespan, and Bruce Edmund Smart, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 8, 1975, Ser. No. 638,996

Int. Cl.² C07C *45/00*

U.S. Cl. 260—586 R **6 Claims**

1. A process for preparing α, β-cycloalkenones which comprises contacting and reacting in an inert atmosphere sulfur trioxide and a cyclic fluorovinyl ether of the formula:



wherein:
X is —H, —Cl, —F, —Br or —OR,
R is alkyl of 1–4 carbon atoms, and
n is 0 or 1;
at a temperature in the range of about 0°–50° C and then isolating the products by distilling the reaction mixture at a pot temperature under about 100° C when *n* is 1 and a pot temperature of about 80°–120° C when *n* is 0.

4,021,490

PROCESS FOR PRODUCTION OF PHENOL AND CYCLOHEXANONE

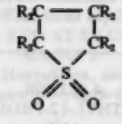
Paul S. Hudson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 14, 1975, Ser. No. 621,897

Int. Cl.² C07C *45/02*, *45/24*, *37/08*, *37/34*

U.S. Cl. 260—586 R **14 Claims**

1. A process for separation of a mixture of phenol and cyclohexanone which comprises extractively distilling said mixture of phenol and cyclohexanone in the presence of a sulfolane having the formula



in which R is hydrogen or an alkyl radical having 1 to 6 carbon atoms or phenyl as the extractive solvent to result in an overhead stream of cyclohexanone and a bottom stream consisting of essentially of a mixture of sulfolane and phenol.

6. A process for the production of phenol and cyclohexanone which comprises

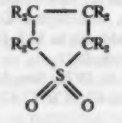
a. converting benzene in the presence of a reductive alkylation catalyst to cyclohexylbenzene,

b. contacting said cyclohexylbenzene in an oxidation step with oxygen or an oxygen-containing oxidizing compound and thereby at least partially converting said cyclohexylbenzene into cyclohexylbenzene hydroperoxide.

c. contacting said cyclohexylbenzene hydroperoxide in a cleavage step with a strong acid and thereby at least partially converting it into a mixture comprising phenol, cyclohexanone and cyclohexylbenzene,

d. separating cyclohexylbenzene in a separation step from said mixture comprising phenol, cyclohexanone and cyclohexylbenzene to result in a stream consisting essentially of phenol and cyclohexanone,

e. extractively distilling said stream of phenol and cyclohexanone in the presence of a sulfolane having the general formula



wherein the radicals R, which can be the same or different, are individually selected from the group consisting of hydrogen, lower alkyl radicals having 1 to 6 carbon atoms and phenyl as the extractive solvent in an extraction step to result in a stream consisting essentially of cyclohexanone and another stream consisting essentially of a mixture of phenol and sulfolane.

7. A process in accordance with claim 6 wherein the reaction mixture obtained by the oxidation step is extracted with methanol to result in an extract consisting essentially of methanol and cyclohexylbenzene hydroperoxide and wherein said extract is then further treated by subjecting it to said cleavage step.

4,021,491

MANUFACTURE OF 2,6,6-TRIMETHYL-CYCLOHEX-2-EN-1-ONE

Werner Hoffmann, Neuhofen, and Manfred Baumann, Mannheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

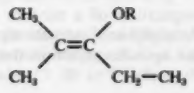
Filed Jan. 19, 1976, Ser. No. 650,517

Claims priority, application Germany, Feb. 6, 1975, 2504930

Int. Cl.² C07C *45/00*

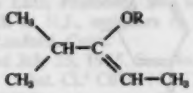
U.S. Cl. 260—586 C **2 Claims**

1. A process for the manufacture of 2,6,6-trimethyl-cyclohex-2-en-1-one, wherein the trisubstituted enol-ether of the formula I



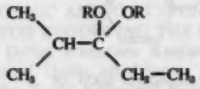
(I)

where R is alkyl of 1 to 5 carbon atoms, or the isomeric enol-ether of the formula II



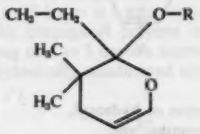
(II)

where R has the above meaning, or a mixture of the said enol-ethers, or a compound which forms a mixture of the said enol-ethers under the reaction conditions selected from the group consisting of ketals of the formula VI



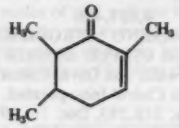
(VI)

is reacted with acrolein at from 130° to 220° C, and the resulting 2-alkoxy-2-ethyl-3,3-dimethyl-2,3-dihydro-4H-pyran of the formula III



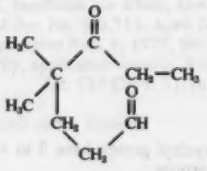
(III)

is converted to 2,6,6-trimethyl-cyclohex-2-en-1-one of the formula V



(V)

either directly by treatment with a strong acid having a dissociation constant of at least 10^{-3} at from 0° to 250° C or indirectly by a first treatment with a weak aqueous acid having a dissociation constant of at most 10^{-3} which yields the 4,4-dimethylheptane-1,5-dione of the formula IV



(IV)

followed by treatment with a strong acid having a dissociation constant of at least 10^{-3} at from 0° to 250° C.

4,021,492

DIBROMINATION PROCESS

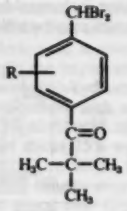
Jerome Linder, Westfield, and William J. Houlihan, Mountain Lakes, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 561,484, March 24, 1975, abandoned. This application Nov. 12, 1975, Ser. No. 630,971

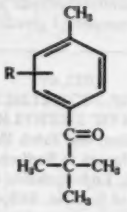
Int. Cl.² C07C *49/80*

U.S. Cl. 260—592 **4 Claims**

1. An improved process for preparing a compound of the formula



where R represents hydrogen, halo having an automic weight of about 19 to 36,
which comprises adding liquid bromine to a compound of the formula



at a mole ratio of 2–2.5:1 at a temperature from about 125° to 175° C.

4,021,493

VANILLIN RECOVERY PROCESS

Frederick William Major, and Francois Marcel André Nicolle, both of Hawkesbury, Canada, assignors to Canadian International Paper Company, Montreal, Canada

Continuation of Ser. No. 413,911, Nov. 8, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 610,929

Int. Cl.[2] C07C *45/24*

U.S. Cl. 260—600 A **9 Claims**

1. A purification process for separating vanillin from related phenolic impurities in which an aqueous alkaline solution of vanillin and said related phenolic impurities is treated with sulfur dioxide or an acidic salt of sulfurous acid to form the bisulfite addition complex of vanillin and to adjust the pH in the range 3.0 to 4.5, which treatment is conducted in the presence of a water-immiscible alcohol selected from the class consisting of normal-, iso-, secondary-, and tertiary-butyl alcohols, normal-, and iso-amyl alcohols and 4-methyl-2-pentanol, in order to extract non-reacting tarry impurities deposited during the acidification, separating the said water-immiscible alcohol layer formed, removing the remaining aqueous phase to an extraction zone where the aqueous solution of vanillin-bisulfite complex is subjected to extraction with fresh said water-immiscible alcohol to remove water-soluble, non-reacting impurities, the said alcohol extract of impurities being then separated and returned to treatment with sulfur dioxide or an acid salt of sulfurous acid, where it entrains and dissolves unwanted tarry impurities deposited during acidification, acidifying said aqueous solution by the addition of acid to cleave the bisulfite addition complex of vanillin, leaving the vanillin in said aqueous solution substantially free from said related phenolic impurities and thereby separating said vanillin from said related phenolic impurities.

4,021,494

PROCESS FOR PREPARING TRICYCLIC ALCOHOLS

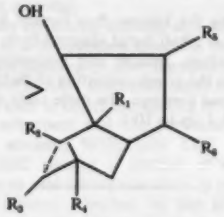
Kenneth K. Light, Long Branch, N.J.; Edward J. Shuster, Brooklyn, N.Y.; Joaquin F. Vinals, Red Bank, and Manfred Hugo Vock, Locust, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 485,554, July 3, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,428

Int. Cl.[2] C07C *45/00*, *49/54*

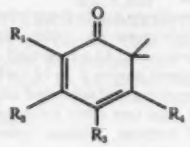
U.S. Cl. 260—617 F **9 Claims**

1. A process for producing a compound having the structure:

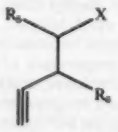


wherein each of R_1, R_2, R_3, R_4, R_5 and R_6 is the same or different and represents hydrogen or methyl and wherein the dashed line represents a carbon-carbon single bond when one of R_2 or R_3 is hydrogen or a carbon-carbon double bond when R_2 and R_3 are each methyl comprising the steps of:

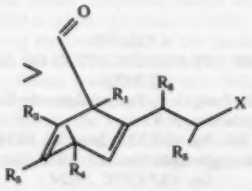
a. Intimately admixing at a temperature in the range of 170°–260° C at autogeneous pressure a methyl-substituted cyclohexadienone having the structure:



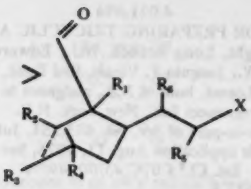
with an acetylenic compound having the structure:



the mole ratio of methyl-substituted cyclohexadienone:acetylenic compound being 1:1, where X is selected from the group consisting of chloro and bromo thereby forming a diene compound having the structure:



b. Hydrogenating the diene compound at a temperature in the range of 100°–200° C and a pressure of 5–15 atmospheres with hydrogen in the presence of a hydrogenation catalyst selected from the group consisting of palladium, platinum and nickel thereby producing a ketone having the structure:



and c. Cyclizing the ketone thus formed by treating said ketone with an alkali metal selected from the group consisting of sodium, lithium and potassium in a solvent selected from the group consisting of diethyl ether, tetrahydrofuran and benzene, the mole ratio of ketone:metal being from 1:1 up to 10:1.

4,021,495

PURIFICATION OF β-NAPHTHOL

Hirokazu Hosaka, Hirakata; Kunihiko Tanaka, Ibaraki, and Yuji Ueda, Izumiotsu, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed June 18, 1975, Ser. No. 588,117
Claims priority, application Japan, June 19, 1974, 49-70506
Int. Cl.² C07C *39/14*
U.S. Cl. 260—621 A 7 Claims

1. A process for purifying crude β-naphthol obtained via an alkylnaphthalene hydroperoxide route, comprising heating said crude β-naphthol using (1) a saturated aliphatic or alicyclic hydrocarbon solvent having 5 to 10 carbon atoms, or (2) a mixed solvent comprising said saturated aliphatic or alicyclic hydrocarbon and at least one other solvent selected from the group consisting of benzene, toluene, xylene, ethylbenzene, diethylbenzene, cumene, cymene, acetone, methyl ethyl ketone, methyl n-propyl ketone, methyl isopropyl ketone, methyl isobutyl ketone, methanol, ethanol, propanol, ethylene glycol, di-isopropyl ether, diethyl ether, ethylene glycol monoether, methyl acetate, ethyl acetate, propyl acetate, butyl acetate and ethylene glycol monoester to a temperature not higher than the reflux temperature of said hydrocarbon solvent or solvent mixture employed, and separating the resulting crystals of β-naphthol at a temperature of −20° to 50° C, the amount of said hydrocarbon solvent or solvent mixture being about 1 to 20 times by weight based on the weight of the crude β-naphthol.

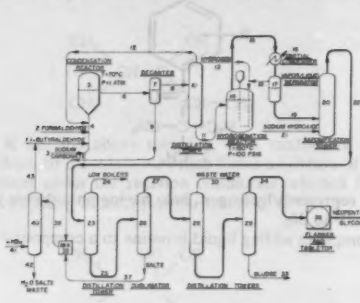
4,021,496

PROCESS FOR THE PURIFICATION OF NEOPENTYL GLYCOL

Roger L. Wright, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 483,321, June 26, 1974, Pat. No. 3,939,216. This application Nov. 17, 1975, Ser. No. 632,760
Int. Cl.² C07C *29/24*
U.S. Cl. 260—637 P 2 Claims

1. A process for recovery of neopentyl glycol from an aqueous neopentyl glycol-containing stream wherein said neopentyl glycol-containing stream is mixed with sufficient isobutyraldehyde to provide an isobutyraldehyde to water ratio of at least about 0.18:1.0 and subsequently separated to form an aqueous stream essentially free of neopentyl glycol and an organic stream comprising isobutyraldehyde and neopentyl glycol which organic stream may be utilized in a manufacturing process wherein isobutyraldehyde and formaldehyde are condensed to produce neopentyl glycol.



4,021,497

PRODUCTION OF 2-ETHYLHEXANOL-(1) BY HYDROGENATION OF 2-ETHYLHEXEN-(2)-AL-(1)

Karl Adam, Ludwigshafen, and Erich Haarer, Bad Durkheim, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation-in-part of Ser. No. 860,435, Sept. 23, 1969, abandoned, which is a continuation-in-part of Ser. No. 647,204, June 19, 1967, abandoned. This application May 30, 1972, Ser. No. 257,536
Claims priority, application Germany, June 25, 1966, 1269605
Int. Cl.² C07C *29/14*
U.S. Cl. 260—638 B 3 Claims

1. A process for the production of 2-ethylhexanol-(1) which comprises contacting with hydrogen 2-ethylhexen-(2)-al-(1) dissolved in 2-ethylhexanol-(1) as the inert solvent at a pressure of 1 to 500 atmospheres gauge and a temperature of 80° to 200° C, in the presence of a hydrogenation catalyst consisting essentially of cobalt, copper and manganese wherein, based on said metals, the cobalt content is 72.3% to 73.9%, the copper content is 20.9% to 24.8% and the manganese content is 2.9% to 5.2% and 0.5 to 15% by weight, calculated as phosphorus pentoxide and based on the metal content of said catalyst exclusive of support, of pyrophosphoric acid or polyphosphoric acid in free form or partly or wholly in the form of at least one salt of said metals.

4,021,498

ADIABATIC PROCESS FOR NITRATION OF NITRATABLE AROMATIC COMPOUNDS

Verner Alexanderson, Plainfield; James Bryant Trecek, Bridgewater, and Cornelius Marsden Vanderwaart, Basking Ridge, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 9, 1975, Ser. No. 639,019
Int. Cl.² C07C *79/10*, *79/12*
U.S. Cl. 260—645 9 Claims

1. In an adiabatic process for the production of mononitro compounds, which are stable in the presence of hot sulfuric acid, from nitratable aromatic hydrocarbons or halogen substituted aromatic hydrocarbons, which are stable in the presence of hot sulfuric acid, wherein a mixed acid is contacted with up to a 10 percent stoichiometric excess of said nitratable aromatic hydrocarbon or halogen substituted aromatic hydrocarbon to form a reaction mixture, in such a manner that the heat of mixing, and the heat of reaction are substantially adsorbed by said reaction mixture, and said reaction mixture is then separated into two portions, one portion consisting of the mononitro compound and unreacted nitratable aromatic hydrocarbon or halogen substituted aromatic hydrocarbon

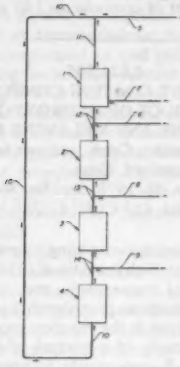
and the other portion consisting substantially of hot aqueous sulfuric acid substantially free of nitric acid, and said portion of hot aqueous sulfuric acid is concentrated to its original concentration, wherein the improvement comprises: contacting said nitratable aromatic hydrocarbon or halogen substituted aromatic hydrocarbon with a mixed acid containing from about 5% to 8.5% nitric acid, about 60% to 70% sulfuric acid and not less than about 25% water, at a temperature in the range of about 40° C. to 80° C. for a period of about 0.5 to 7.5 minutes, whereby the temperature of the reaction mixture does not exceed about 145° C.

4,021,499

PROCESS FOR SEPARATING ETHYLBENZENE

Herbert J. Bieser, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 5, 1975, Ser. No. 628,866
Int. Cl.² C07C 7/00
U.S. Cl. 260—674 SA **19 Claims**



8. In a process for the separation of ethylbenzene from a feed stream comprising a mixture of ethylbenzene and para-xylene which process employs an adsorbent comprising type X or type Y zeolite containing calcium at the exchangeable cationic sites and comprises the steps of:

a. maintaining net fluid flow through a column of an adsorbent in a single direction, which column contains three zones having separate operational functions occurring therein and being serially interconnected with the terminal zones of said column connected to provide a continuous connection of said zones;

b. maintaining an adsorption zone in said column, said zone defined by the adsorbent located between a feed input stream at an upstream boundary of said zone and a raffinate output stream at a downstream boundary of said zone;

c. maintaining a purification zone immediately upstream from said adsorption zone, said purification zone defined by the adsorbent located between an extract output stream at an upstream boundary of said purification zone and said feed input stream at a downstream boundary of said purification zone;

d. maintaining a desorption zone immediately upstream from said purification zone, said desorption zone defined by the adsorbent located between a desorbent input stream at an upstream boundary of said zone and said extract output stream at a downstream boundary of said zone;

e. passing said feed stream into said adsorption zone at adsorption conditions to effect the selective adsorption of para-xylene by said adsorbent in said adsorption zone and withdrawing a raffinate stream comprising ethylbenzene from said adsorption zone;

f. passing a desorbent material comprising toluene into said desorption zone at desorption conditions to effect the displacement of para-xylene from the adsorbent in said desorption zone, and the adsorption of toluene by said adsorbent;

g. withdrawing an extract stream comprising para-xylene and desorbent material from said desorption zone;

h. passing at least a portion of said raffinate stream to a separation means and therein separating at separation conditions ethylbenzene from said desorbent material to produce an ethylbenzene product substantially free of desorbent material;

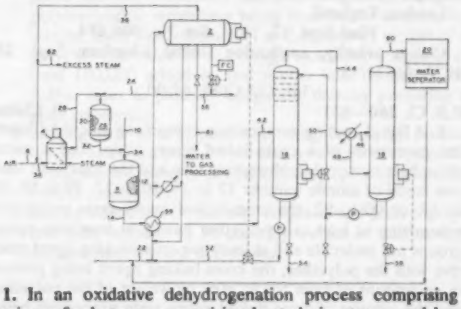
i. periodically advancing through said column of adsorbent particles in a downstream direction with respect to fluid flow in said adsorption zone the feed input stream, raffinate output stream, desorbent input stream, and extract output stream to effect the shifting of zones through said mass of adsorbent and the production of extract and raffinate streams, WHEREIN THE IMPROVEMENT COMPRISES passing a portion of said ethylbenzene product into said adsorption zone to effect the displacement of toluene adsorbed by the adsorbent during a previous contacting of said adsorbent with desorbent material in said desorption zone.

4,021,500

OXIDATIVE DEHYDROGENATION SYSTEM

Ronald S. Rogers, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 13, 1972, Ser. No. 288,731
Int. Cl.² C07C 5/48
U.S. Cl. 260—680 E **4 Claims**



1. In an oxidative dehydrogenation process comprising passing a feed stream comprising heated air, steam, and hydrocarbons into a dehydrogenation catalytic reactor, catalytically converting the feed stream in the reactor, and discharging an effluent stream from the reactor for further processing, said reactor effluent comprising water, dehydrogenated hydrocarbon, oxygenated hydrocarbon derivatives, and unconverted hydrocarbon, the improvement comprising: continuously during said carrying out the steps of

A. separating water from the dehydrogenation reactor effluent;

B. passing the separated water into a catalytic oxidation reactor;

C. treating said separated water in said catalytic oxidation reactor so as to convert any organic compounds therein to a carbonaceous gas; and thereafter

D. passing the treated water from said catalytic oxidation reactor into the dehydrogenation catalytic reactor.

4,021,501

PRODUCTION OF HYDROCARBONS

Peter Dyer, and David Charles Alexander Waterman, both of Billingham, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 12, 1975, Ser. No. 605,447

Claims priority, application United Kingdom, Aug. 28, 1974, 37572/74

Int. Cl.² C07C *3/30*

U.S. Cl. 260—683 R 11 Claims

1. A process of thermally cracking a hydrocarbon feedstock wherein, prior to abrupt quenching of the process stream, the process stream emerging from the radiant zone of a pyrolysis furnace at a temperature above 700° C is allowed to undergo endothermic reaction beyond the radiant zone for a period of at least 0.03 seconds such that its temperature falls as a result of heat uptake by continued endothermic reactions from a value above 700° C whereby to enhance ethylene yield.

4,021,502

CONVERTING LOW MOLECULAR WEIGHT OLEFINS OVER ZEOLITES

Charles J. Plank, Woodbury; Edward J. Rosinski, Pedricktown, and Edwin N. Givens, Pitman, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 24, 1975, Ser. No. 552,487

Int. Cl.² C07C *3/20*

U.S. Cl. 260—683.15 R 8 Claims

1. A process for producing a gasoline or a gasoline blending stock, the process comprising passing a feedstock consisting essentially of a C_2–C_5 olefin, mixtures of such olefins or mixtures of such olefins with C_1–C_5 paraffins over ZSM-4, ZSM-18 or Chabazite at a temperature of from about 450° F to about 1200° F, a WHSV of from about 0.2 to about 50 and a hydrocarbon partial pressure of from about 0.1 to about 50 atmospheres.

4,021,503

COATING COMPOSITION

Terence Goulding, and Michael Leslie Orton, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 17, 1974, Ser. No. 506,854

Claims priority, application United Kingdom, Sept. 25, 1973, 44824/73

Int. Cl.² C08L *63/00*

U.S. Cl. 260—831 11 Claims

1. A liquid coating composition comprising a liquid diluent, the precursors of a cross-linked epoxy resin, and a metal phosphate comprising phosphate ions and the ions of at least one metal of atomic number 12 to 14, 20 to 32, 39 to 50, 56 to 80, or 90 to 92, the cross-linked epoxy resin precursors comprising at least one polyether having at least two epoxy groups per molecule and at least one cross-linking agent reactive with the polyether, the cross-linking agent being present in an amount of from 5% to 40% by weight of the polyether and the amount of cross-linked epoxy resin precursors being in the range 1% to 90% by weight of the total weight of the cross-linked epoxy resin precursors plus metal ions of the metal phosphate.

4,021,504

THERMOSETTING COATING COMPOSITION OF ACRYLIC INTERPOLYMERS

Daniel T. Conrad, Cuyahoga Falls; William C. Mast, Stow, and Tom M. Wathen, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 412,215, Nov. 2, 1973, abandoned. This application May 5, 1975, Ser. No. 574,800

Int. Cl.² C08L *25/14*, *33/02*

U.S. Cl. 260—836 11 Claims

1. Thermosetting powder coating compositions consisting of (A) at least one carboxyl functional thermosetting acrylic interpolymer having a second order transition temperature ranging from 30° to 80° C. and prepared by the polymerization in the presence of a chain transfer agent at a temperature in the range of about −10° C. to about 100° C. of a monomeric mixture consisting of (1) from 0 to 50 percent by weight of a vinyl aromatic hydrocarbon, (2) from 20 to 88 percent by weight of a methacrylic acid ester, (3) from 10 to 40 percent by weight of an acrylic acid ester and (4) from 2 to 20 percent by weight of an olefinically unsaturated carboxylic acid containing from 1 to 3 carboxyl groups selected from the group consisting of acrylic acid, methacrylic acid, fumaric acid, maleic acid, methyl maleic acid, methyl fumaric acid, ethyl maleic acid and itaconic acid propene-1,2,3-tricarboxylic acid, all percentages based on the total weight of monomers charged and (B) at least one curing agent selected from the group consisting of di- and multifunctional epoxides derived from the reaction of epichlorohydrin or glycidyl ether with a polyhydric phenol or a polyhydric compound selected from the group consisting of glycerol, polyglycols, novalac resins and polynuclear polyhydroxy phenols and polyepoxides of olefins, cycloolefins and cyclic dienes, and wherein component (A) ranges from 50 to 92 percent by weight and component (B) ranges from 50 to 8 percent by weight all based on total combined weight of components (A) and (B).

4,021,505

MAR-RESISTANT COATING COMPOSITION OF REACTION PRODUCT OF HYDROXY-TERMINATED URETHANE AND MELAMINE RESIN

Samuel S. Wang, Cheshire, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 20, 1975, Ser. No. 560,415

Int. Cl.² C08L *61/28*

U.S. Cl. 260—856 10 Claims

1. A coating composition consisting essentially of a mixture of (1), (2) and (3), in which the ratio of (1) to (2) ranges from about 5:1 to about 1:1, respectively, and

1. is a saturated urethane prepolymer having terminal hydroxy groups which is the reaction product of materials consisting essentially of a mixture of (a) and (b), at a molar ratio of 1:2, respectively, in which
   a. is an isocyanate-terminated urethane which is the reaction product of a mixture consisting essentially of (I) and (II), at a molar ratio of 1:2, respectively, in which
      I. is a saturated diol having a molecular weight of from about 200 to about 3000, and
      II. is a saturated organic diisocyanate, and
   b. is a monomeric, sterically bulky, polyhydric alcohol containing 2–6 hydroxyl groups and being free of oxyalkylene units,
2. is a polyalkyl ether of a polymethylol melamine, and
3. is an acid catalyst.

4,021,506

UNSATURATED, LINEAR POLYESTER COMPOSITIONS

Hans Batzer, Arlesheim, and Jurgen Habermeier, Pfeffingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 521,128, Nov. 5, 1974. This application Oct. 30, 1975, Ser. No. 627,166

Claims priority, application Switzerland, Nov. 13, 1973, 15954/73; Aug. 6, 1974, 10736/74

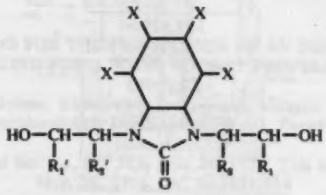
Int. Cl.² C08L *67/06*

U.S. Cl. 260—868 6 Claims

1. A curable composition which comprises

a. 38 to 99.95% by weight of an unsaturated, flame-retardant, linear polyester consisting essentially in the total condensed acid component of at least 20 mol % of an unsaturated dicarboxylic acid selected from the group consisting of maleic, fumaric, itaconic, citraconic and dimethylmaleic acids and up to 80 mol % of a saturated aromatic or aliphatic dicarboxylic acid selected from the

group consisting of phthalic, terephthalic, isophthalic, 2,5-dibromoterephthalic, succinic, glutaric, adipic, pimelic, suberic, azelaic and sebacic acids; and in the total condensed diol component of at least 18 mol % of a brominated or of at least 47 mol % of a chlorinated benzimidazolone diol of formula I



wherein X independently denotes bromine or chlorine, $R_1$and R_1' each denotes hydrogen, methyl, ethyl or phenyl, and R_2 and R_2' each denotes hydrogen or R_1 together with R_2 and R_1' together with R_2' each denote trimethylene or tetramethylene; the amount of diol of formula I incorporated in said polyester being that required to bring the bromine content of said polyester to at least 15 weight % or the chlorine content to at least 20 weight %; and with the remaining condensed diol component selected from the group consisting of ethylene glycol, diethylene glycol, polyethylene glycol of up to 24 carbon atoms, propylene glycol, dipropylene glycol, polypropylene glycol of up to 24 carbon atoms, 1,4-butanediol, 1,12-dodecanediol, neopentyl glycol and 1,4-cyclohexanediol,

b. 0 to 60% by weight of an olefinically unsaturated polymerizable comonomer selected from the group consisting of styrene, divinylbenzene, vinyl acetate, diallyl phthalate, diglycolic acid diallyl ester, diethylene glycol-bis-allyl carbonate, diallylphenyl phosphate, triallyl cyanurate, the alkyl esters of acrylic acid, the alkyl esters of methacrylic acid, ethylene glycol dimethacrylate, acrylonitrile and methacrylonitrile, and

c. 0.05 to 2% by weight of a polymerization catalyst.

4,021,507

POLYESTER ELASTOMERIC PARTICLES

David Norman Ford, E. Doncaster, Australia, assignor to ICI Australia Limited, Australia

Filed Oct. 15, 1974, Ser. No. 515,019

Claims priority, application Australia, Nov. 2, 1973, 5515/73

Int. Cl.² C08L *67/06*

U.S. Cl. 260—873 **4 Claims**

1. A polyester elastomeric particle comprising a saturated elastomeric core comprising a condensation polymer of a dicarboxylic acid, a triol and a diol wherein no component contains a tertiary hydrogen atom, a tertiary hydrogen atom being a hydrogen atom attached to a carbon atom to which no other hydrogen atom is bonded, an intermediate layer covalently bound to the elastomeric core, said intermediate layer comprising a condensation polymer of a dicarboxylic acid, a triol, and a diol wherein at least one of the components of the intermediate layer contains a tertiary hydrogen atom and an addition polymer surface layer of methyl methacrylate grafted on to the intermediate layer wherein the elastomeric core is capable of absorbing not more than 150% w/w of xylene at ambient temperatures, the polyester elastomeric particle being in the size range from 0.01 to 10 microns in diameter.

4,021,508

VINYL CHLORIDE -EPDM RESIN COMPOSITIONS

Kakusaburo Nakanishi, Uozu; Tatsuro Yoshida, Namerikawa, and Kyoku Nakatubo, Kurobe, all of Japan, assignors to Ryo-Nichi Co., Ltd., Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,488

Claims priority, application Japan, July 5, 1974, 49-77070

Int. Cl.² C08L *51/04*

U.S. Cl. 260—876 R **6 Claims**

1. An easily processable, and weather and impact-resistant vinyl chloride resin composition comprising a vinyl chloride resin and a vinyl chloride graft copolymer, said graft copolymer containing 10 – 60% by weight of an ethylene-propylene-diene terpolmer and resulting from suspension polymerization of a vinyl chloride monomer with said ethylene-propylene-diene terpolymer in an aqueous phase in the presence of an aliphatic alcohol having not less than 8 carbon atoms, there being 1 to 40% by weight of said terpolymer based on said composition.

4,021,509

PRODUCTION OF IMPACT-RESISTANT, THERMOPLASTIC RESIN COMPOSITIONS

Naohiro Murayama; Takayuki Katto; Yo Iizuka, and Teruo Sakagami, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 17, 1975, Ser. No. 569,071

Claims priority, application Japan, Apr. 18, 1974, 49-43744; Apr. 18, 1974, 49-43745

Int. Cl.² C08L *9/06*

U.S. Cl. 260—880 R **6 Claims**

1. A process for producing thermoplastic resin compositions of excellent transparency and impact resistance which comprises

1. causing a monomer component consisting essentially of methyl methacrylate and styrene in a weight ratio of from 8/20 to 30/65 to undergo post polymerization in the presence of from 40 to 70 parts by weight, in terms of solid component, of a conjugated diolefin polymer rubber latex containing at least 50 percent by weight of a conjugated diolefin monomer, the total weight of the post polymerization monomers being from 95 to 60 parts by weight, there being from 0.01 to 2.0 parts by weight of a polyethylene oxide of an average molecular weight of at least 100,000 added to said rubber latex to cause the rubber latex to partially coagulate, thereby preparing a graft copolymer,
2. causing from 40 to 80 percent by weight of methyl methacrylate and from 60 to 20 percent by weight of styrene to copolymerize, thereby preparing a methyl methacrylate-styrene copolymer, and
3. mixing from 15 to 50 parts by weight of said graft copolymer with from 85 to 50 parts by weight of said methyl methacrylate-styrene copolymer.

4,021,510

CYANO-SUBSTITUTED NORBORNENE POLYMERS BLENDED WITH POLYVINYL CHLORIDE RESINS

Takashi Ueshima, Yokohama; Yasuzi Tanaka; Toshiro Yokoyama, both of Kawasaki, and Shoichi Kobayashi, Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1974, Ser. No. 452,623

Claims priority, application Japan, Sept. 19, 1972, 47-93273; Oct. 4, 1973, 48-110957; Oct. 5, 1973, 48-111526

Int. Cl.² C08L *27/06, 33/18, 51/04*

U.S. Cl. 260—891 **3 Claims**

1. Resin compositions comprising 5 to 90 parts by weight of homopolymer prepared by ring-opening polymerization of 5-cyano bicyclo[2,2,1]-heptene-2 and 95 to 10 parts by weight of polyvinyl chloride resin selected from the group consisting of vinyl chloride homopolymer, vinyl chloride-vinyl

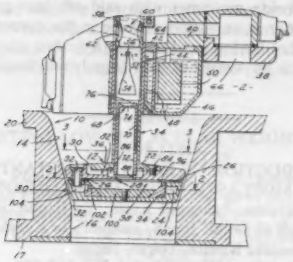
acetate copolymers, vinyl chloride-ethylene copolymers, vinyl chloride-propylene copolymers and vinyl chloride-vinyl ether copolymers.

4,021,511

FUEL DISTRIBUTOR APPARATUS FOR PLUG-TYPE CARBURETOR

Warren F. Kaufman, Santa Ana, Calif., assignor to Ford Aerospace & Communications, Dearborn, Mich.

Filed Feb. 12, 1976, Ser. No. 657,670
Int. Cl.² F02M 9/14
U.S. Cl. 261—44 A **4 Claims**



1. A carburetor having an induction passage open at one end to a source of air at an ambient pressure level and connected at its opposite end to an engine intake manifold, the passage containing an air and fuel metering conical nozzle portion receiving therein a plug to define between the plug and nozzle a constricted high velocity flow zone, the plug having a peripheral annular air/fuel mixture induction slot communicating with the high velocity zone for the induction of an air/fuel mixture into the engine in response to a vacuum signal generated in the zone upon operation of the engine, air/fuel mixture supply means connected to the plug slot, and fuel distribution means located in the plug in communication with both the air/fuel mixture supply means and the fuel induction slot to uniformly distribute any liquid fuel droplets present in the air/fuel mixture around the annulus of the slot for a uniform distribution into the zone and engine, the fuel distribution means including a vortex chamber having an outlet connected to the induction slot and first tangentially located air inlets connected to the air source for creating a vortex in the chamber, the chamber having another inlet receiving the air/fuel mixture for the intermix of liquid fuel with the vortex air and the swirling of the resulting mixture around the chamber for a uniform distribution around the annulus of the fuel induction slot.

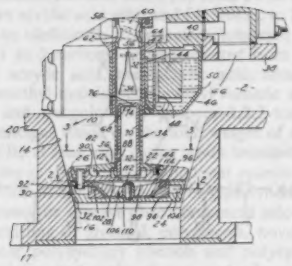
4,021,512

CARBURETOR AIR TURBINE FUEL DISTRIBUTOR

Warren F. Kaufman, Santa Ana, Calif., assignor to Aeronutronic Ford (now Ford Aerospace and Communications), Dearborn, Mich.

Filed Feb. 12, 1976, Ser. No. 657,669
Int. Cl.² F02M 9/14
U.S. Cl. 261—44 A **4 Claims**

1. A carburetor having an induction passage open at one end to a source of air at an ambient pressure level and connected at its opposite end to an engine intake manifold, the passage containing an air and fuel metering conical nozzle portion receiving therein a plug to define between the plug and nozzle a constricted high velocity flow zone, the plug having a peripheral annular air/fuel mixture induction slot communicating with the high velocity zone for the induction of an air/fuel mixture into the engine in response to a vacuum signal generated in the zone upon operation of the engine, air/fuel mixture supply means connected to the plug slot, and fuel distribution means located in the plug in communication with both the air/fuel mixture supply means and the fuel induction slot to uniformly distribute any liquid fuel droplets present in the air/fuel mixture around the annulus of the slot for a uniform distribution into the zone and engine, the fuel distribution means including a vortex chamber having an outlet connected to the induction slot and tangentially located



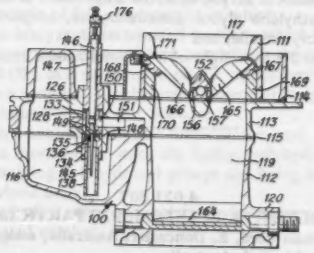
air inlets connected to the air source for creating a vortex in the chamber, the chamber having an air turbine driven by the air in the inlets, the air/fuel mixture cooperating with the air turbine for a centrifuging of the fuel globules towards the slot in a uniform manner for the intermix of liquid fuel with the vortex air.

4,021,513

CARBURETERS

Thomas James Ullman, Cranfield, England, assignor to The Zenith Carburetor Company Limited, Stanmore, England

Filed Nov. 4, 1974, Ser. No. 520,656
Claims priority, application United Kingdom, Nov. 7, 1973, 51756/73
Int. Cl.² F02M 9/08
U.S. Cl. 261—50 A **24 Claims**



1. An air valve carburetter of the pivoted flap air valve type comprising body, a branched through passage extending through the body, the branched through passage comprising a single upstream passage portion, a pair of downstream passage portions and a junction passage portion in communication with both the downstream passage portions; a bar that is supported by the body within a part of the through passage which is upstream of the two downstream passage portions whereby it extends substantially diametrically with respect to the two downstream passage portions; at least one throttle valve in the through passage downstream of the bar for controlling air flow through the two downstream passage portions; a pair of air valve flaps disposed within the through passage upstream of the downstream passage portions, said valve flaps being mounted pivotally within the body on opposite sides of the bar that extends between them, each of the pair of pivoted air valve flaps extending across the upstream ends of both the downstream passage portions co-operating with the bar to form a throat of variable area between itself and the bar and

being disposed to pivot in response to a tendency for a depression established within either downstream passage portion between the bar and the throttle valve that controls air flow through that downstream passage portion to vary and thus to oppose a tendency for that depression to vary; and a fuel supply system operable to supply metered quantities of fuel from a respective fuel metering orifice to that part of the branched through passage between the bar and said at least one throttle valve through at least one fuel discharge nozzle in the bar.

4,021,514

METHOD FOR THE PRODUCTION OF AN INHIBITOR COATING FOR A SOLID ROCKET PROPELLENT CHARGE

Eduard Daume, Richterswil, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Division of Ser. No. 587,322, June 16, 1975. This application Mar. 29, 1976, Ser. No. 671,414

Claims priority, application Switzerland, June 21, 1974, 8518/74

Int. Cl.² C06B *21/00*

U.S. Cl. 264—3 E **10 Claims**

1. A method of producing an inhibitor coating for a solid propellent charge for protecting against undesired burning-off, the inhibitor coating containing an insulating layer composed of a binder and a filler, a protective and adhesion layer located between the insulating layer and the propellent charge, the binder having poor smoke developing properties, the filler consisting of a fine granular cooling agent possessing good packability, the protective and adhesion layer comprising a completely hardened polyisocyanate forming a barrier against plasticizer migration, said method comprising for forming the insulating layer admixing a pre-adduct to the cooling agent, and adding at least one member selected from the group consisting of an aromatic diamine, an aliphatic plasticizer and an aliphatic polyol, applying the insulating layer of the inhibitor coating to the propellent charge by casting and hardening said insulating layer at a temperature in the order of about 20° C to 80° C, and wherein prior to casting the insulating layer there is applied a protective- and adhesion layer composed of 20 parts by weight triphenylmethane- 4,4', 4''-**trilsocyanate,** 80 parts by weight methylene chloride, and 10 to 100 parts by weight of butyl acetate.

4,021,515

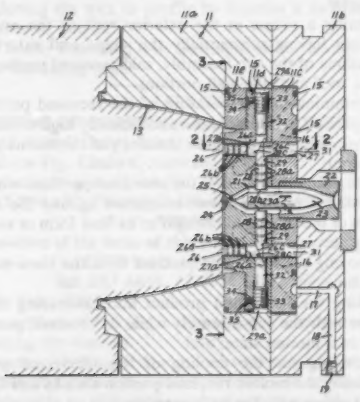
PLASTIC INJECTION MOLD WITH SELF-ADJUSTING CORING APPARATUS

Clayton L. Neuman, Coon Rapids, Minn., assignor to A-1 Engineering, Inc., Coon Rapids, Minn.

Filed Apr. 15, 1976, Ser. No. 677,271

Int. Cl.² B29F *1/022, 1/06*

U.S. Cl. 264—40.5 **13 Claims**



12. The method of creating a void of desired configuration in a molded article made with plastic injection apparatus which comprises relatively movable mold sections defining a mold cavity therebetween and a coring member cooperable with the mold cavity to create said void, the method comprising the steps of:

a. supplying hot melted plastic to the mold cavity under pressure;

b. sensing the inlet pressure of the hot melted plastic before it enters the mold cavity;

c. and moving the coring member into the mold cavity as a function of said inlet pressure before the hot melted plastic fills the mold cavity.

4,021,516

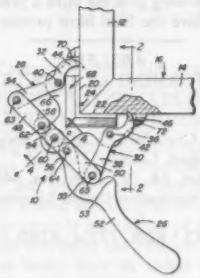
DRAW CLAMP

Cleatus G. Stevenson, P.O. Box 436, Ashland, Mont. 59003

Continuation-in-part of Ser. No. 572,919, April 29, 1975. This application Sept. 20, 1976, Ser. No. 724,531

Int. Cl.² B25B *1/20*

U.S. Cl. 269—41 **11 Claims**



1. A draw clamp for holding together abutting portions of a frame being joined to one another, the clamp comprising, in combination:

a. a base member provided with a pair of planar support surfaces extending into the base member toward one another and meeting at substantially a right angle with respect to one another to form a cradle for supporting frame portions to be joined together;

b. a handle pivotally mounted on the base member;

c. a pair of locking jaws pivotally mounted at a pivot on the base member, and each including a pair of arms extending away from the pivot and terminating in a fang, with one of the arms of each of the locking jaws being associated with a respective one of the support surfaces for selectively gripping a frame portion being supported by the one of the support surfaces provided on the base member;

d. a pair of links each pivotally connected to the handle and to the other of the arms of a respective one of the locking jaws and arranged for selectively pivoting the locking jaws relative to the base member and gripping and ungripping the frame portions supported by the cradle formed by the support surfaces of the base member; and

e. means associated with the pivotal mounting of the handle for effecting a locking action on same.

4,021,517
METHOD OF PRODUCING HOLLOW ARTICLES OF PLASTICS MATERIAL

Jurgen Schmidt, Herborn, and Jurgen Hesse, Dusseldorf, both of Germany, assignors to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed Sept. 4, 1975, Ser. No. 610,316

Claims priority, application Germany, Sept. 4, 1974, 2442254

Int. Cl.² B29C *17/07, 25/00*

U.S. Cl. 264—85 **5 Claims**

1. In a method of producing hollow articles of plastic material by blow molding, wherein a preform is expanded in a blow mold by means of a liquefied gas at low temperature and the article is cooled, and wherein the gas flows into the preform through a single pipe, which is provided with a valve controlled in time with the working cycle of the machine, and through a blow mandrel in such a manner that at the beginning of the admission phase the gas drawn off in liquefied form from a reservoir held under pressure is vaporized by the warm pipe and the warm blow mandrel, passes out of the blow mandrel in gas form and expands the preform, during the further course of the admission phase the gas is only partly vaporized because of the cooling of the pipe and of the blow mandrel, and finally at the end of the admission phase it flows into the preform in the liquid state, characterized in that compressed air is additionally blown into the preform at the beginning of the admission phase in order to intensify the inflation operation and its admission is interrupted before the final blow pressure is reached, and the compressed air comprising a minor amount of the gas required for inflation with the compressed air thereby supporting the liquefied gas which performs the major portion of the inflation operation and the compressed air performing this supporting operation from the beginning of the blowing process until a predetermined pressure is reached before the final blow pressure is reached.

4,021,518
METHOD OF FORMING AN ARTICLE INCLUDING REINFORCING ELEMENTS ENCAPSULATED IN THERMOPLASTIC MATERIAL

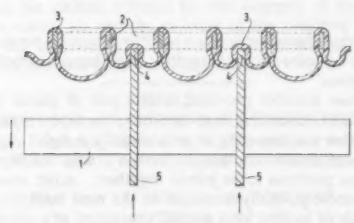
Herbert J. Sharp, Greenford, England, assignor to Bridgend Investments Limited, London, England

Filed Jan. 14, 1975, Ser. No. 540,768

Claims priority, application United Kingdom, Jan. 14, 1974, 1745/74

Int. Cl.² B29C *17/04;* **B29D** *3/02*

U.S. Cl. 264—92 **2 Claims**



1. A method of forming a substantially two-dimensional array of reinforcing elements completely encapsulated in a thermoplastic material, comprising the steps of:

a. supporting an array of reinforcing elements above a vacuum forming table on movable support means extending upwardly with respect to the remainder of the table,

b. positioning a sheet of hot thermoplastic material over said array,

c. applying a vacuum through said table to draw the sheet down around and underneath said reinforcing elements,

d. lowering said reinforcing elements by retracting the support means to a position at which the thermoplastic material contacts the table and is at least partially supported thereby,

e. continuing the retraction of the support means to a position substantially flush with the plane of the table after the thermoplastic material is capable of supporting the reinforcing elements above the table, and

f. continuing to apply a vacuum to draw the sheet around and underneath the reinforcing elements at the locations thereon above the support means.

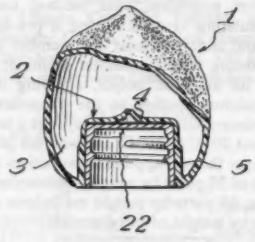
4,021,519
METHOD FOR FORMING AND KEEPING MOLTEN THE RECESSED AREA OF A FABRICATED PLASTIC PRODUCT

David F. Krueger, Minneapolis, and Edmond S. Kaliszewski, South St. Paul, both of Minn., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Feb. 14, 1972, Ser. No. 225,996

Int. Cl.² B29C *17/07, 24/00, 27/30*

U.S. Cl. 264—96 **10 Claims**



1. In the blow-molding of plastic fabricated products for a subsequent engagement with a sub-assembly wherein the fabricated product has an outer portion integral with an internal recess portion, the recess portion being designed to embrace the sub-assembly, the method comprising:

a. closing a mold onto a molten parison of thermoplastic material;

b. forming a recess in the exterior wall of the enclosed parison having substantially the shape and exterior dimensions of the sub-assembly, said recessed portion having a roof and side wall portion;

c. maintaining the temperature of the recessed portion of the parison at a temperature sufficiently high to substantially inhibit the relaxation tendency of the thermoplastic material;

d. maintaining the recess at the above temperature while the remainder of the parison is inflated against the cooled walls of the mold and brought to its final form or substantially so;

e. removing the fabricated product from the blow-molding machine;

f. placing the fabricated product into embracing engagement with the sub-assembly while its recessed portion is still in a molten state; and

g. providing for the cooling of the fabricated product whereby the molten recessed portion shrinks and forms a tight union with the sub-assembly.

4,021,520
PROCESS FOR THE MANUFACTURE OF FILAMENT YARN HAVING PROTRUDING FILAMENT ENDS

Karl Heinrich, and Fritz Schneider, both of Bobingen, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 12, 1974, Ser. No. 450,438

Claims priority, application Germany, Mar. 17, 1973, 2313473

Int. Cl.² D01G *1/00*

U.S. Cl. 264—103 **2 Claims**

1. A process for the manufacture of filament yarns having fine protruding filament ends, which comprises drawing the filaments, subjecting the drawn filaments, wherein at least part of the filaments consist of polymers the lateral bending resistance of which can be thermally influenced, to an intermittent sectional heat treatment along the length of said filaments thus ensuring that sections of the heat treated filaments have a low lateral bending resistance, and subsequently breaking these sections of low lateral bending resistance by bending around an edge, twisting or false twisting which causes formation of the desired free filament ends.

4,021,521
MANUFACTURE OF WORK-HARDENED WIRES AND PROFILES

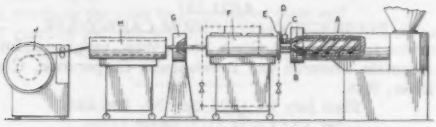
Karl Heinz Scholl, Lambsheim, and Gerhard Grimm, Altrip, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed July 21, 1975, Ser. No. 597,658

Claims priority, application Germany, July 31, 1974, 2436874

Int. Cl.² B29D *7/14*

U.S. Cl. 264—108 **10 Claims**



1. A process for the manufacture of a work-hardened wire or profile from a thermoplastic material reinforced with aluminum needles comprising the following steps: mixing a polyamide or a polyolefin in the melt with from 5 to 40% by weight, based on the mixture, of aluminum needles of length from 0.3 to 6 mm, of average diameter from 0.02 to 0.1 mm and of length to average diameter ratio from 3 : 1 to 100 : 1; extruding the mixture to give a wire or profile in which the aluminum needles are substantially axially oriented; cooling the extruded wire or profile to a temperature not above 50° to 60° C;

hardening the wire or profile by drawing it to from 2 to 10 times its length;

and finally annealing it by passing it under tension through an annealing zone.

4,021,522
METHOD OF FORMING COLLAGEN DISPERSIONS

Leonard Daniel, Grays Point, Australia, assignor to Collagen Products Pty. Limited, Australia

Continuation-in-part of Ser. No. 395,994, Sept. 10, 1973, Pat. No. 3,894,132. This application June 26, 1975, Ser. No. 590,611

The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.

Int. Cl.² A61L *17/00;* C07G *7/00*

U.S. Cl. 264—138 **19 Claims**

1. A method of forming a dispersion of collagenous fibres comprising the steps of:

a. treating a collagenous material with an aqueous solution of an alkaline earth metal hydroxide and an alkali metal hydroxide to reduce the cohesion between the collagen fibres, present in the material, the alkali metal hydroxide having a concentration of from 0.25 to 2 molar and the treatment being carried out at a temperature between the freezing point of the mixture and 30° C;

b. severing the collagenous material into particles; and

c. mechanically dispersing the collagen fibres to free the fibres from one another substantially along their whole length and substantially without further reduction of the fibre length, the size of the particles of step (b) being such that at least 95% by weight of the fibres obtained in step (c) are retained after neutralisation on a 297 micron U.S. standard sieve when a sample of the fibres is placed on the screen and flushed with water.

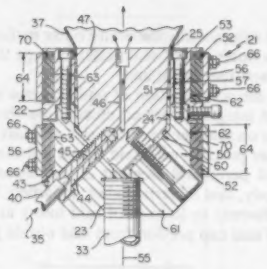
4,021,523
METHOD OF EXTRUDING PLASTIC FILM

Richard M. Rice, Afton, Va., assignor to Reynolds Metals Company, Richmond, Va.

Division of Ser. No. 438,185, Jan. 31, 1974, Pat. No. 3,932,103. This application Oct. 22, 1975, Ser. No. 624,602

Int. Cl.² B29F *3/08*

U.S. Cl. 264—209 **8 Claims**



1. A method of extruding plastic film through a die comprising the steps of, feeding a plastic melt under pressure to the die inlet, expanding the melt within the die to form an annulus of plastic melt, supporting a heat conductive band against said die, said supporting step comprising the steps of providing an elongated member of an easily windable heat conductive metallic material and winding said elongated member in a plurality of closely wound adjoining turns to define said band wherein said turns provide a plurality of interfaces therebetween which assure said band has a circumferential heat conductivity which is better than its radial heat conductivity, extruding said melt annulus through a die orifice and solidifying the melt into a plastic tube, and heating said band with a heater disposed against a portion of said band, said band assuring that heat is transmitted so that practically all points of an annular portion of said die body located adjacent said band are substantially at the same temperature to assure flow of said melt with optimum efficiency through said die.

4,021,524
METHOD OF MAKING A COLLAPSIBLE TUBE WITH AN INTEGRAL CAP

Arvid Kjellsen Grimsley, Stamford, Conn., assignor to American Can Company, Greenwich, Conn.

Filed Aug. 15, 1975, Ser. No. 604,937

Int. Cl.² B29C *27/00;* B29F *1/00*

U.S. Cl. 264—242 **5 Claims**

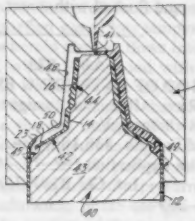
1. In a method for the production of a closed container having a body, an insert having a shoulder portion and a neck portion providing an outlet passage therefrom, and a cap for the insert, the steps comprising:

at least partially disposing within a mold cavity a body having an opening therein, with at least the edge portion thereof defining said opening being in contact with the surface of said cavity;

disposing a nozzle insert, having an externally threaded

neck portion at one end providing an outlet passage and a shoulder portion with a peripheral element at the opposite end thereof, within said mold cavity with said neck portion extending-outwardly from said body into said mold cavity, and with said peripheral element within said body and in spaced-apart, proximate relationship to said edge thereof, said insert being spaced from said cavity surface to define a closure-forming space therebetween;

introducing into said closure-forming space a flowable resinous material to provide a quantity of said material over



at least substantially the entire outer surface of said insert and the outer end of said outlet passage thereof, to cover said insert therewith; and

effecting the solidification of said resinous material to provide an integrally-formed closure member having a cap portion on said neck portion and a breast portion on said shoulder portion, with said breast portion sealingly joining said peripheral element of said shoulder portion to said body, said material, when solidified, being relatively non-adherent to threads of said insert to permit separation of said cap portion from said nozzle portion thereof.

4,021,525

TRONA CALCINATION

Rustom P. Poncha, Syracuse, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed June 17, 1975, Ser. No. 587,577
Int. Cl.² C01D 7/00
U.S. Cl. 423—184 **8 Claims**

1. In the process of making sodium carbonate from trona involving the steps of crushing the trona, calcining the crushed trona, dissolving the calcined trona to obtain a solution comprising sodium carbonate and insoluble impurities, contaminated by soluble silicates, contamination of the sodium carbonate solution with soluble silicates and soluble carbonaceous matter is reduced by the improvement which comprises calcining the crushed trona at temperatures of 200° C. to 600° C. in the presence of from 0.2 to 5 parts by weight per 100 parts of trona of an additive selected from the group consisting of bauxite, aluminum oxide and mixtures thereof in any proportion.

4,021,526

SOLUBLE SILICATE REDUCTION IN CALCINED TRONA LIQUORS

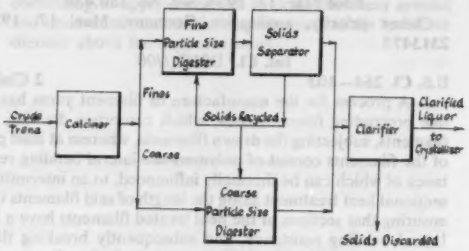
Alan B. Gancy, and Rustom P. Poncha, both of Syracuse, N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed June 17, 1975, Ser. No. 587,585
Int. Cl.² C01D 7/00
U.S. Cl. 423—184 **17 Claims**

1. In the process of making sodium carbonate from trona by crushing the trona, calcining the crushed trona, dissolving the calcined trona comprising sodium carbonate, insoluble impurities and soluble silicates in an aqueous medium, followed by separation of insoluble impurities to obtain a sodium carbonate solution, the improvement which comprises:

a. segregating the calcined trona into a coarse particle size fraction and a fine particle size fraction;

b. separately dissolving the coarse and the fine particle size fractions in aqueous media to obtain solutions comprising sodium carbonate, soluble silicates and insoluble impurities; and



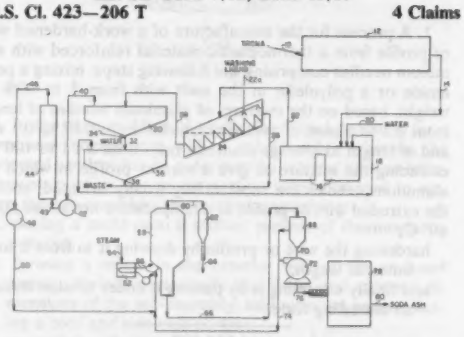
c. digesting the aqueous sodium carbonate solution obtained from the fine particle size fraction at a temperature above about 160° F. for time sufficient to insolubilize soluble silicates, and separating the digested solution from insoluble impurities.

4,021,527

PRODUCTION OF SODIUM CARBONATE

Marinus J. Baadsgaard, Green River, Wyo., assignor to Intermountain Research and Development Corporation, Green River, Wyo.

Filed July 16, 1975, Ser. No. 596,484
Int. Cl.² C01D 7/12; B01D 15/00
U.S. Cl. 423—206 T **4 Claims**



1. Process for preparing dense sodium carbonate from trona which comprises calcining crude trona to obtain crude sodium carbonate, mixing the crude sodium carbonate with an aqueous liquor to form a solution of crude sodium carbonate containing coarse and fine solids, clarifying the crude sodium carbonate solution, passing the clarified sodium carbonate solution upwardly through an activated carbon bed at a flow velocity sufficient to provide at least a 5% expansion of said bed over its static state, but wherein said velocity is insufficient to form a fluidized bed, to remove organic impurities, evaporating the clarified carbon-treated sodium carbonate solution to crystallize sodium carbonate monohydrate crystals therefrom, separating said sodium carbonate monohydrate crystals from their mother liquor and calcining the separated crystals to produce dense soda ash.

4,021,528

PROCESS FOR PREPARING $AlH_3(PO_4)_2 \cdot 3H_2O$

Albert Schlegel, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 23, 1975, Ser. No. 543,496
Claims priority, application Germany, Jan. 26, 1974, 2403707
Int. Cl.² C01B 15/16, 25/26
U.S. Cl. 423—308 16 Claims

1. A process for preparing crystalline $AlH_3(PO_4)_2 \cdot 3H_2O$ by crystallization from an aqueous solution which comprises preparing a mixture of Al $(H_2PO_4)_3$ and an organic solvent miscible with water, slowly adding water to said mixture to form an aqueous solution, crystallizing $AlH_3(PO_4)_2 \cdot 3H_2O$ from said solution and recovering crystalline $AlH_3(PO_4)_2 \cdot 3H_2O$.

4,021,529

NON-CATALYTIC SYNTHESIS OF SILICON OXYNITRIDE

Areekattuthazhayil K. Kuriakose, Niagara Falls, Canada, assignor to Norton Company, Worcester, Mass.

Continuation of Ser. No. 421,966, Dec. 5, 1973, abandoned. This application Oct. 21, 1975, Ser. No. 624,419
Int. Cl.² C01B 21/06
U.S. Cl. 423—325 2 Claims

1. A method of making silicon oxynitride from a mixture consisting essentially of finely divided silica a silicon in the ratio of 3 moles of silicon per mole of silica, and containing less than 0.1% by weight of alkaline earth oxides comprising:

1. first heating said mixture in an inert atmosphere at about 1400° C to form a "sinter" or "cake" while avoiding melting of the silicon, for a time at least sufficient to form a film of silicon oxide on the silicon particles in the mix, followed by
2. crushing the cake to a powdered state and
3. reacting said mix with nitrogen at a temperature of from 1380° C to 1470° C to form Si_2ON_2.

4,021,530

PREPARATION OF METAL FLUORIDES

Gilbert S. Layne, and James O. Huml, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 445, Jan. 2, 1970, abandoned. This application June 23, 1972, Ser. No. 265,782
Int. Cl.² C01B 9/08, 9/08
U.S. Cl. 423—489 12 Claims

1. In the process of heating in a reaction zone a mixture of an impure aluminum source and a molten metal fluoride to produce gaseous products of aluminum monofluoride and metal vapors and a residual phase containing the aluminum source partially depleted in aluminum, and an impure molten metal fluoride phase containing metal oxides and carbon, the improvement which comprises:

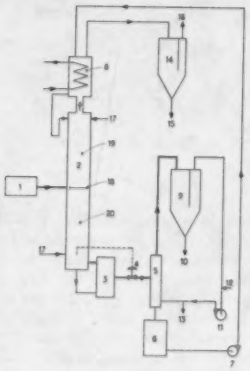
a. separating the impure molten metal fluoride phase from the residual phase;
b. adjusting the carbon to oxygen molar ratio in the molten metal fluoride phase to at least about one by adding either carbon or a metal oxide;
c. reacting in a reaction zone a molten mixture containing the mixture of step (b) and a metal fluorinating agent, said metal fluorinating agent provided in an amount sufficient to establish in said reaction mixture a fluoride to oxygen atom ratio based on the fluoride from the fluorinating agent, ranging from about 0.1 to less than about 2 times the valence of the cation of the metal fluorinating agent to produce a gaseous oxide of carbon, a fluorinated product derived from the cation of the metal oxide and a metal product derived from the cation of the metal fluorinating agent, said metal fluorinating agent having a Gibbs Free Energy computed on an equivalent fluoride atom basis which is greater than the Gibbs Free Energy of the metal fluoride product; and
d. separating said reaction products from each other.

4,021,531

PROCESS FOR THE SEPARATION OF ZIRCONIUM AND HAFNIUM TETRACHLORIDES FROM MIXTURES THEREOF

Paul Besson, La Chambre; Jean Guerin; Pierre Brun, both of Grenoble, and Michel Bakes, La Celle-Saint-Cloud, all of France, assignors to Ugine Aciers, Paris, France

Continuation of Ser. No. 447,902, March 4, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,277
Claims priority, application France, Nov. 14, 1973, 73.40395
Int. Cl.² C01G 25/04, 27/04
U.S. Cl. 423—492 9 Claims

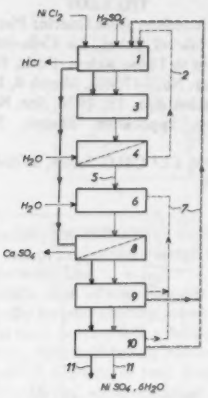


1. A continuous process for the separation of zirconium and hafnium tetrachloride from mixtures thereof by selective absorption in the vapor state for recovering a zirconium tetrachloride having less than 200 ppm hafnium comprising the steps of passing the mixture of zirconium and hafnium tetrachloride in the vapor state through a contact zone in countercurrent flow with a molten solvent selected from the group consisting of an alkali metal chloroaluminate, an alkali metal chloroferrate and mixtures thereof, in which the alkali metal chloroaluminate has the formula $nAlCl_3.pMeCl$ and the alkali metal chloroferrate has the formula $nFeCl_3.pMeCl$ in which Me is an alkali metal and n and p are the number of moles and in which the ratio of n/p is maintained above .95 but below 1.30, and maintaining the temperature within the range of 250°–550° C and the pressure below 5 bars in the contact zone, whereby zirconium tetrachloride is adsorbed in the solvent flowing in one direction through the contact zone while hafnium chloride continues to flow as an enriched vapor phase in the other contact zone, removing and condensing the enriched phase of hafnium tetrachloride from one end portion of the contact zone, removing the zirconium tetrachloride enriched solvent phase from the other end of the contact zone, and separating from the solvent phase a purified zirconium tetrachloride having less than 200 ppm hafnium, and said process including the step of recycling the solvent to the contact zone and adding $AlCl_3$ when the solvent is an alkali metal chloroaluminate and $FeCl_3$ when the solvent is an alkali metal chloroferrate, and mixtures of $AlCl_3$ and $FeCl_3$ when the solvent is a mixture of alkali metal chloroaluminate and alkali metal chloroferrate to maintain the molar ratio of n/p.

4,021,532
PROCESS FOR THE PRODUCTION OF HYDRATED NICKEL SULPHATE

Louis Gandon, Rambouillet, and Gilbert Cheneau, Les Essarts le Roi, both of France, assignors to Le Nickel, Paris, France

Continuation of Ser. No. 419,542, Nov. 28, 1973, abandoned. This application Nov. 3, 1975, Ser. No. 628,373
Claims priority, application France, Nov. 28, 1972, 72.42221
Int. Cl.² C01G 53/10; C01B 7/08
U.S. Cl. 423—544 6 Claims



1. A process for the production of hydrated nickel sulphate, comprising successively the following steps:

a. reacting sulphuric acid, nickel chloride, and the recycled mother-liquor from steps (c) and (d) in a sulphating reaction vessel at the boiling point of the reaction mixture to obtain a solution of nickel sulphate containing suspended impurities, while partially removing the hydrogen chloride gas formed until the chloride concentration has been reduced to about from 3 to 130 grams per liter, the total amount of sulphuric acid in said reaction mixture being between 0.9 and 1.1 times the quantity required stoichiometrically for the conversion of all the nickel chloride into nickel sulphate;

b. clarifying said nickel sulfate solution obtained from step (a) to remove suspended impurities comprising calcium sulphate;

c. crystallizing nickel sulfate from the clarified solution from step (b), and recycling the mother-liquor obtained at this stage to the sulphating reaction vessel of step (a);

d. dewatering the wet crystals from step (c) to obtain substantially dry hexahydrate crystals essentially free from chloride ions, and recycling the mother-liquor obtained at this stage to the sulphating reaction vessel of step (a); and

e. washing said substantially dry hexahydrate crystals obtained from step (d) with a member selected from the group consisting of water, alcohol, and a solution of nickel sulphate.

4,021,533
MANUFACTURE OF TITANIUM DIOXIDE BY THE SULPHATE PROCESS USING NUCLEI FORMED BY STEAM HYDROLYSIS OF $TiCl_4$

Luigi Piccolo, Milan; Marcello Ghirga, Bresso (Milan), and Antonio Paolinelli, Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Sept. 29, 1975, Ser. No. 617,954
Claims priority, application Italy, Oct. 4, 1974, 28050/74
Int. Cl.² C01G 23/04
U.S. Cl. 423—610 10 Claims

7. In a process for the manufacture of titanium dioxide in rutile form by a sulphate process, wherein a titanium sulphate solution is hydrolyzed to transform the soluble titanium sulphate into insoluble titanium hydroxide and said titanium hydroxide is converted into titanium dioxide in rutile form by calcination, the improvement which comprises adding to the solution to be hydrolyzed an aqueous suspension of titanium hydroxide prepared by the steps comprising:

a. transforming, in a first stage, titanium tetrachloride into a compound of the general formula $Ti(OH)_xCl_y$ where x ranges from 1 to 3, y from 3 to 1 and $x+y$ is equal to 4, by contacting the vapor phase titanium tetrachloride with steam in a molar ratio of titanium tetrachloride to steam of from 1:1 to 1:3, at a temperature of from 400° to 800° C for a period of from 0.1 to 30 seconds; and

b. placing into contact, in a second stage, the reaction products of the first stage with an aqueous solution of sodium hydroxide in such an amount as to separate an aqueous suspension containing titanium hydroxide with a titanium content, expressed as TiO_2, of from 10 to 30 grams/liter and having a pH value of from 3 to 4, in a quantity ensuring the addition of from 0.5 to 5 parts by weight of titanium, expressed as TiO_2, in said suspension per 100 parts by weight of titanium expressed as TiO_2 present in the titanium sulphate solution.

4,021,534
RADIOIMMUNOASSAY

George Stanford Lafontaine, Budd Lake, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 12, 1975, Ser. No. 640,114
Int. Cl.² G01N 33/00; A61K 39/00; G21H 5/02
U.S. Cl. 424—1 8 Claims

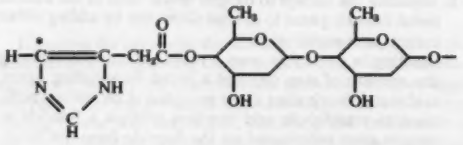
3. In an indirect radioimmunoassay procedure, wherein a radiolabeled antigen complexed with its antibody is separated from unreacted radiolabeled antigen, the improvement which comprises insolubilizing the antigen-antibody complex by reacting it with a second antibody directed against the antibody in the antigen-antibody complex, said second antibody being bound to para-aminobenzyl cellulose.

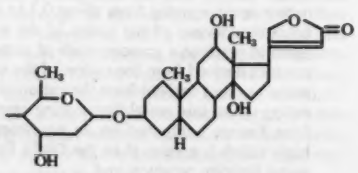
4,021,535
REAGENTS USED IN THE RADIOIMMUNOASSAY OF DIGOXIN

Alan J. Polito, Costa Mesa, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

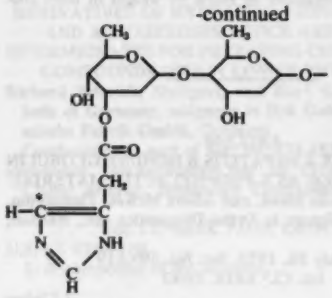
Filed Jan. 14, 1975, Ser. No. 540,809
Int. Cl.² A61K 43/00
U.S. Cl. 424—1 9 Claims

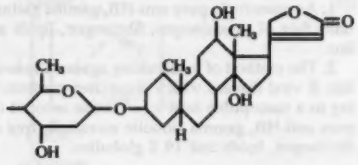
1. A radioimmunoassay reagent having the structural formulae:





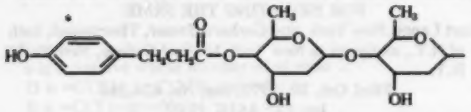
-continued

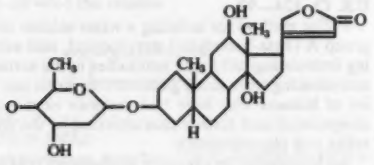


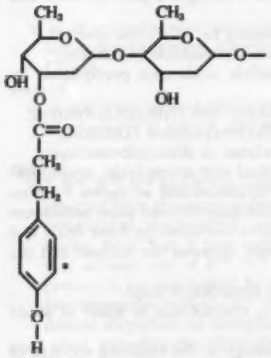


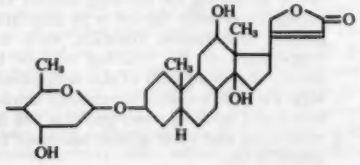
wherein the asterisk * indicates radioactive labelling.

7. In a method for the determination of quantities digoxin in blood by radioimmunoassay, the improvement comprising the use of a compound having the following formulae as the radioimmunoassay reagent:









wherein the asterisk * indicates radioactive labelling.

4,021,536

MAGNESIUM-ZIRCONIUM COMPLEXES USEFUL AS ANTIPERSPIRANTS

Andrew M. Rubino, New Providence, N.J., assignor to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Apr. 18, 1975, Ser. No. 569,248
Int. Cl.² A61K 7/34
U.S. Cl. 424—47 **13 Claims**

1. An astringent, water-soluble complex formed by reacting in an aqueous solution:

a. a zirconium compound selected from trioxodizirconium hydroxy salts and the group having the general empirical formula:

$$ZrO(OH)_{2-nz}B_z$$

wherein z may vary from about 0.9 to 2 and need not be an integer, n is the valence of B, 2-nz is greater than or equal to 0, and B is selected from the group consisting of halide, nitrate, sulfamate, sulfate and mixtures thereof; and

b. a magnesium compound comprising a magnesium-amino acid salt; said zirconium and magnesium compounds being present in amounts such that the weight ratio of zirconium to magnesium expressed in terms of the oxides as ZrO_2/MgO is in the range of about 30:1 to 1:1.

11. A method of inhibiting perspiration comprising suspending the dired complex of claim 1 in an aerosol propellant, said complex being present in the aerosol propellant to an extent of about 1 to 6 weight percent of the propellant, and spraying the resulting suspension on the human axilla.

4,021,537

ORAL BACTERICIDAL COMPOSITIONS

Vincent R. Saurino, Boca Raton, Fla., assignor to Research Lab Products, Inc., Boca Raton, Fla.

Continuation of Ser. No. 386,873, Aug. 9, 1975, abandoned. This application Apr. 24, 1975, Ser. No. 571,398
Int. Cl.² A61K 7/22
U.S. Cl. 424—54 **38 Claims**

1. A method of removing dental plaque from teeth which comprises contacting said teeth with a composition of matter comprising (a) a synergistic mixture of a quaternary ammonium compound (1) and a quaternary ammonium compound (2), said compound (1) being an n-alkyl (5% C_{12}, 60% C_{14}, 30% C_{16}, 5% C_{18}) dimethyl benzyl ammonium chloride and said compound (2) being n-alkyl (68% C_{12}, 32% C_{14})-dimethyl-ethylbenzyl ammonium chloride, the proportions of said compounds (1) and (2) being in the range of 5% to 95% of compound (1) and 95% to 5% of compound (2) and (b) a water soluble or water dispersable ester of bis(tri-n-butyltin) oxide, the said composition of matter containing about 1 to 200 parts by weight of said synergistic mixture (a) for each part by weight of said ester of tributyl tin oxide.

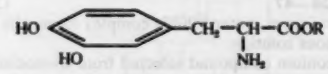
10. A method of preventing the formation of dental plaque on teeth which comprises contacting said teeth with a composition of matter comprising (a) a synergistic mixture of a quaternary ammonium compound (1) and a quaternary ammonium compound (2), said compound (1) being an n-C_{13-18} alkyl, dimethyl, benzyl ammonium halide and said compound (2) being an n-C_{12-14} alkyl dimethyl ethylbenzyl ammonium halide and (b) a water-soluble or water dispersible ester of bis(tri-n-butyltin)oxide.

4,021,538
METHOD FOR PRODUCING PIGMENTATION IN HAIR OR SKIN

Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128, and Eugene J. Van Scott, 1138 Sewell Lane, Rydal, Pa. 19046

Filed Sept. 29, 1975, Ser. No. 617,739
Int. Cl.² A61K 7/44, 7/13
U.S. Cl. 424—60 26 Claims

1. A method for producing pigmentation in hair or skin comprising: topically applying to preselected areas of the body, a composition comprising an effective pigmentation producing amount of at least one DOPA ester selected from the group consisting of esters having the formula



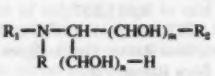
wherein R is an alkyl, aryl or alkylene radical having from 1 to 12 carbon atoms, and methyl dopate in a pharmaceutically acceptable vehicle.

4,021,539
SKIN TREATING COSMETIC COMPOSITIONS CONTAINING N-POLYHYDROXYALKYL-AMINES

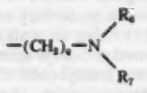
Hinrich Möller, Dusseldorf-Benrath; Rainer Osberghaus, Dusseldorf-Urdenbach; Christian Gloxhuber, Haan, and Siegfried Braig, Hilden, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Jan. 28, 1975, Ser. No. 544,859
Claims priority, application Germany, Jan. 29, 1974, 2404070
Int. Cl.² A61K 7/15, 7/48
U.S. Cl. 424—73 9 Claims

1. A cosmetic composition for maintaining or restoring a certain hygroscopicity in the skin for the protection of the skin of warm-blooded animals consisting essentially of an aqueous composition having a pH of between 5 and 7 and containing from 1 to 20% by weight of at least one N-polyhydroxyalkylamine compound selected from the group consisting of (1) amines of the formula



wherein R_1 is a member selected from the group consisting of hydrogen, alkyl having from 1 to 18 carbon atoms, hydroxyalkyl having from 2 to 6 carbon atoms, dihydroxyalkyl having from 3 to 6 carbon atoms, trihydroxyalkyl having from 4 to 6 carbon atoms, and



wherein R_6 and R_7 are members selected from the group consisting of hydrogen, alkyl having from 1 to 12 carbon atoms, hydroxyalkyl having from 1 to 3 carbon atoms, with the proviso that only one of R_6 and R_7 can be hydrogen, and, when taken together with the nitrogen, pyridyl, piperazino, morpholino, furfuryl, pyrrolidino and hydroxyalkylpiperazino having from 1 to 3 carbon atoms in the alkyl, and q is an integer from 1 to 3, R is the same as R_1, with the proviso that only one of R and R_1 can be hydrogen, and R and R_1 together with the nitrogen, are alkylpiperazino having from 1 to 3 carbon atoms in the alkyl or hydroxyalkylpiperazino having from 1 to 3 carbon atoms in the alkyl, R_2 is a member selected from the group consisting of $—CH_2OH$ and —COOH, m is the integer 3 or 4, and n is the integer 0, or, when m is 3 and R_2 is $—CH_2OH$, 1, and (2) physiologically-compatible acid addition salts thereof, and the remainder to 100% by weight of inert cosmetic excipients.

4,021,540
PREPARATION OF A HEPATITIS B IMMUNE GLOBULIN AND USE THEREOF AS A PROPHYLACTIC MATERIAL

William Pollack, Belle Mead, and Albert McKee, Flemington, both of N.J., assignors to Ortho Diagnostics Inc., Raritan, N.J.

Filed July 28, 1975, Ser. No. 599,619
Int. Cl.² A61K 39/42
U.S. Cl. 424—86 7 Claims

1. An essentially pure anti-HB_s gamma globulin being essentially free of plasminogen, fibrinogen, lipids and 19 S globulins.

2. The method of immunizing against the incidence of hepatitis B viral disease which comprises parenterally administering to a susceptible host an effective amount of an essentially pure anti-HB_s gamma globulin essentially free of plasminogen, fibrinogen, lipids and 19 S globulins.

4,021,541
ANTIGEN ISOLATED FROM GROUP A (BETA-HEMOLYTIC) STREPTOCOCCI AND METHOD FOR ISOLATING THE SAME

Kurt Lange, New York, and Gerhard Treser, Thornwood, both of N.Y., assignors to New York Medical College, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,266
Int. Cl.² A61K 39/02
U.S. Cl. 424—92 10 Claims

1. The method for isolating a water-soluble substance from group A (beta-hemolytic) streptococci, said substance reacting immunologically with antibodies in the serum of a patient convalescing from acute glomerulonephritis and with antibodies of humans who have had previous exposure to group A streptococci and further characterized by the following properties and characteristics:

not inactivated by exposure to changes in pH between 3 and 9;
activity is destroyed by heating to 70° C. and above;
not dialyzable through a semi-permeable membrane;
does not contain free nucleic acids (not precipitated by streptomycin sulfate);
precipitates by 60% saturation with $(NH_4)_2SO_4$ solution;
does not react with 3,5-dihydroxytoluene (Orcinol);
not inactivated by ribonuclease or desoxyribonuclease;
not immunologically identical with streptolysin, streptodornase, streptokinase or hyaluronidase as shown by non-identity with the precipitin lines between these substances and the serum of a patient convalescing from AGN and the precipitin line formed between the antigen and the patient's serum;

said method comprising the sequence of steps:

a. dispersing said group A streptococci in water of about neutral pH;
b. applying mechanical energy to the resulting mixture of (a) by pressuring the resulting mixture and abruptly reducing the pressure thereof or by subjecting the resulting mixture to ultrasonic vibration, while maintaining the temperature of the resulting mixture below 70° C., thereby disrupting cells of said streptococci;
c. separating the resulting supernatant containing said substance and resulting water-insoluble cell fragments, and
d. recovering said water-soluble substance from the supernatent of (c).

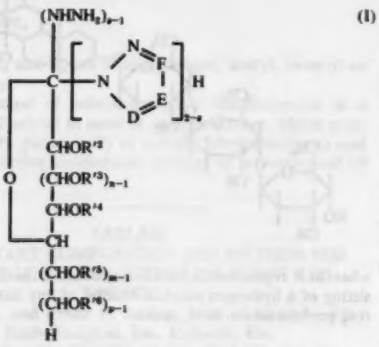
4,021,542

DERIVATIVES OF HYDRAZINO-MONOSACCHARIDES AND ALDOHEXOSES WHICH ARE USEFUL AS INTERMEDIATES FOR PREPARING COMPOUNDS OR AS COMPOUNDS WHICH LOWER THE URIC ACID

Richard Schmidt, Stuttgart, and Kurt Klemm, Allensbach, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Germany

Continuation-in-part of Ser. No. 474,452, May 29, 1974, abandoned. This application Nov. 26, 1974, Ser. No. 527,435
Claims priority, application Luxembourg, June 1, 1973, 67726
Int. Cl.² A61K *31/70*; C07H *19/04*
U.S. Cl. 424—180 39 Claims

1. A compound of the formula



(I)

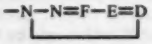
wherein

s is a positive whole number of at most 2;

D is =C(X)—, =C(NH$_2$)- or =N-;

E is =C(Y)- or =N-;

F is =C(X)- or =N-; the residue



being aromatic;

W is -H, -OH or -NH$_2$;

X is -H, alkyl, phenyl or, together with Y, -N=CH-N=C(W)-;

Y is -H, carbethoxy, cyano, carbamoyl, formylcarbamoyl, benzoylcarbamoylor, together with one X, -C(W)=N-CH=N-;

each of

n, *m* and *p* is a positive whole number of at most 2, the sum of *n*+*m*+*p* is at least 4, and at least one of *f n*, *m* and *p* is 1;

each of

R'^{2}, R'^{3}, R'^{4}, R'^{5} and R'^{6} is, independently, -H or a member selected from the group consisting of alkyl, ethylenically-unsaturated hydrocarbyl, aryl, aralkyl, and cycloalkyl having from 3 to 6 ring carbon atoms with the proviso that at least one of R'^{2}, R'^{3}, R'^{4}, R'^{5} and R'^{6}, which is present in the compound, has a meaning other than -H or two respective radicals R'^{2}, R'^{3}, R'^{4}, R'^{5} or R'^{6} together denote alkylidene or benzylidene,

each alkyl, including the alkyl of each aralkyl, each ethylenically-unsaturated hydrocarbyl and each alkylidene having up to seven carbon atoms; each aryl and the aryl of each aralkyl being substituted or unsubstituted phenyl, substituted or unsubstituted α-naphthyl or substituted or unsubstituted β-naphthyl, any substituent of a substituted phenyl, a substituted α-naphthyl or a substituted β-naphthyl being a member selected from the group consisting of alkyl having up to seven carbon atoms, halo, nitro, trifluoromethyl, alkoxy having up to seven carbon atoms, hydroxy, sulfo, sulfino, alkylsulfone having up to seven carbon atoms, alkoxycarbonyl having up to seven carbon atoms, alkylamino having up to seven carbon atoms, dialkylamino having up to seven carbon atoms and carbamoyl; or,

when *s* denotes 2, an open-ring-form tautomer of such compound.

4,021,543

PROCESS FOR DISGUISING SALINE TASTE OF PHARMACEUTICALS AND PRODUCT THEREOF

Gene Darrell McKay, Wauconda, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 28, 1975, Ser. No. 563,020
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 11 Claims

1. A process for disguising saline taste in a pharmaceutical electrolyte solution comprising intermixing with a pharmaceutical electrolyte solution a glucose polymer having an average short-chain length of 3–8 units, in an effective amount to substantially disguise the saline taste of said pharmaceutical electrolyte solution without substantial adverse gastrointestinal effects.

7. A pharmaceutical electrolyte solution having a disguised saline taste comprising a pharmaceutical electrolyte solution and a glucose polymer having an average shortchain length of 3–8 units, said glucose polymer present in an effective amount to substantially disguise the saline taste of said electrolyte solution without substantial adverse gastrointestinal effects.

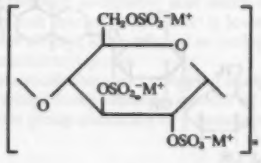
4,021,544

COMPLEMENT INHIBITORS

Vijay Gopalan Nair, Nanuet, N.Y.; Joseph Peter Joseph, Cliffside Park, N.J., and Seymour Bernstein, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 12, 1976, Ser. No. 704,584
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 6 Claims

1. A method of inhibiting the complement system in a body fluid which comprises subjecting said body fluid to the action of an effective complement inhibiting amount of a compound selected from those of the formula:



wherein M represents hydrogen or the salt of an alkali metal, alkaline earth metal, ammonia, triloweralkylamine (C_1–C_6), piperidine, pyrazine, alkanolamine (C_1–C_6); and cycloalkanolamine (C_1–C_6); and *n* is 2–10.

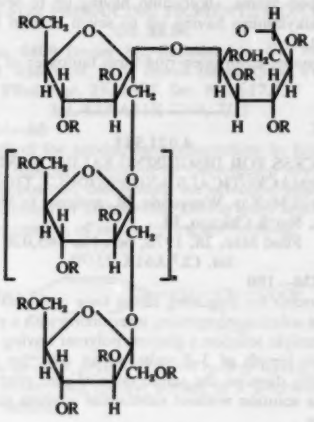
4,021,545

COMPLEMENT INHIBITORS

Vijay Gopalan Nair, Nanuet, N.Y.; Joseph Peter Joseph, Cliffside Park, N.J., and Seymour Bernstein, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 12, 1976, Ser. No. 704,586
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 6 Claims

1. A method of inhibiting the complement system in a body fluid which comprises subjecting said body fluid to the action of an effective complement inhibiting amount of a compound selected from those of the formula:



wherein R is selected from the group comprising $—SO_3A$ and $—SO_3^- HR'^+$, wherein A is hydrogen, alkaline earth or alkali metal; R′ is triloweralkyl (C_1–C_6) amine; and n is 20 through 35.

4,021,546

PRO-DRUG FORMS OF DIGOXIN AND METHOD OF PREPARING AND USING SAME

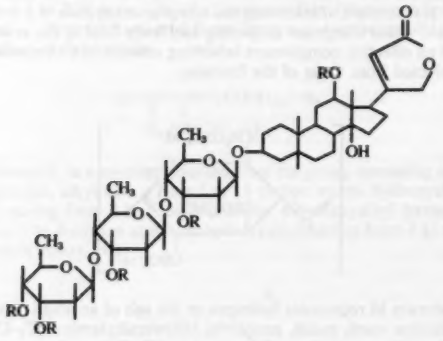
Nicolae S. Bodor, Lawrence, Kans., assignor to Interx Research Corporation, Lawrence, Kans.

Filed Mar. 8, 1976, Ser. No. 664,687

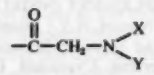
Int. Cl.² A61K *31/705*

U.S. Cl. 424—182 **61 Claims**

1. A pro-drug of digoxin having the formula:



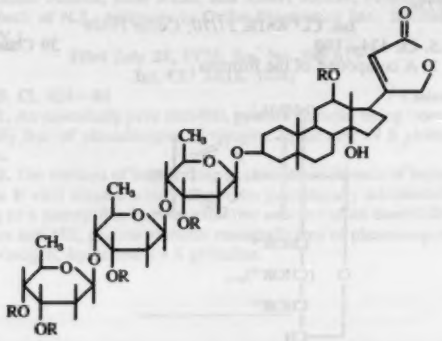
wherein R represents a member selected from the group consisting of a hydrogen atom, a residue of any naturally occurring protein amino acid, and a



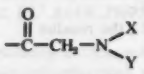
group, wherein X and Y, which may be the same or different, each represent a member selected from the group consisting of a methyl group and an ethyl group, or wherein X and Y may form a $(CH_2)_4$ or $(CH_2)_5$ heterocyclic ring with the N atom to which each of X and Y are attached, and a non-toxic inorganic or organic pharmaceutically acceptable acid addition salt thereof, with the proviso that:

when R is a member other than a hydrogen atom, all of said R's must be the same member.

34. A method for treating cardiac insufficiency in a warm-blooded animal which comprises orally administering thereto, an effective cardiontonic amount of a pro-drug of digoxin having the following formula:



wherein R represents a member selected from the group consisting of a hydrogen atom, a residue of any naturally occurring protein amino acid, and a



group, wherein X and Y, which may be the same or different, each represent a member selected from the group consisting of a methyl group and an ethyl group, or wherein X and Y may form a $(CH_2)_4$ or $(CH_2)_5$ heterocyclic ring with the N atom to which they are attached, and a non-toxic inorganic or organic pharmaceutically acceptable acid addition salt thereof, with the proviso that:

when R is a member other than a hydrogen atom, all of said R's must be the same member.

4,021,547

3β-(α-L-ALTHROMETHYLOSYL)-14β-HYDROXY-BUFA-4,20,22-TRIENOLIDE AND ACYLATED DERIVATIVES THEREOF

Walter Lösel, Ingelheim am Rhein; Werner Traunecker, Munster-Sarmsheim, and Wolfgang Hoefke, Budenheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

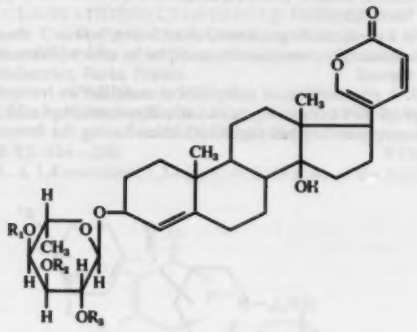
Filed Jan. 21, 1976, Ser. No. 651,045

Claims priority, application Germany, Feb. 1, 1975, 250195

Int. Cl.² A61K *31/705*

U.S. Cl. 424—182 **6 Claims**

1. A compound of the formula



wherein R_1, R_2 and R_3 are each hydrogen, acetyl, benzoyl or p-nitro-benzoyl.

6. The method of relieving cardiac insufficiencies in a warm-blooded animal in need of such treatment, which comprises perorally, parenterally or rectally administering to said animal an effective cardiotonic amount of a compound of claim 1.

4,021,548

DISINFECTANT COMPOSITION AND METHOD FOR CONTROLLING AND DESTROYING FUNGI AND BACTERIA

Jakob Harich, and Franz P. Harich, both of Orlando, Fla., assignors to Rush-Hampton, Inc., Orlando, Fla.

Division of Ser. No. 126,251, March 19, 1971, Pat. No. 3,890,212, which is a continuation-in-part of Ser. No. 27,080, April 9, 1970, abandoned. This application May 8, 1975, Ser. No. 575,800

Int. Cl.² A61K *35/78;* **B01J** *1/10*

U.S. Cl. 424—195 **9 Claims**

1. A disinfectant composition for controlling and destroying fungi and bacteria which comprises an inert, sterile, pharmaceutical carrier containing therein an effective amount of a reaction product obtained by contacting the pulps of grapefruit with a non-toxic polyhydric alcohol to form said reaction product and separating the reaction product from the pulp residue.

4,021,549

FUNGICIDAL COMPOSITIONS BASED ON MONOAMINOPHOSPHITES

Guy Lacroix, and Jean-Claude Debourge, both of Lyon, France, assignors to Philagro, France

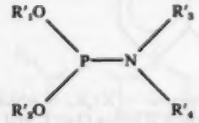
Filed Apr. 3, 1975, Ser. No. 564,592

Claims priority, application France, Apr. 10, 1974, 74.13246

Int. Cl.² A01N *9/36*

U.S. Cl. 424—220 **9 Claims**

1. A process for controlling fungus diseases in susceptible plants, which comprises application to the plant surfaces or the adjacent environment thereof, of a fungicidally effective amount of a composition containing as an active fungicidal agent a monoaminophosphite of the formula:



in which

R'_1 and R'_2, which may be the same or different, each represent a linear or branched alkyl radical containing from 1 to 4 carbon atoms; R'_3 and R'_4 which independently represent hydrogen or an alkyl radical with 1 to 5 carbon atoms or alkenyl radical with 2 to 3 carbon atoms; or metal complexes thereof with metals selected from the group consisting of alkali or alkaline earth metals, zinc, mangenese, magnesium, and copper; in an agriculturally acceptable carrier, for a preventive or curative treatment.

4,021,550

HEXAHYDROAZEPINES AS ANTIINFLAMMATORY AGENTS

Alan Chapman White, Windsor, and Richard Arthur Franklin, Twyford, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

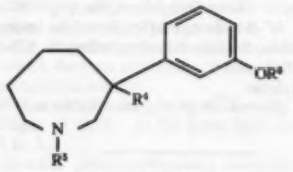
Filed June 7, 1976, Ser. No. 693,665

Claims priority, application United Kingdom, June 18, 1975, 25891/75

Int. Cl.² C07D *223/04*

U.S. Cl. 424—244 **5 Claims**

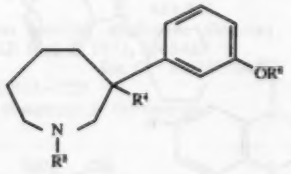
1. A compound selected from the group consisting of a hexahydroazepine of formula



(II)

and a pharmaceutically acceptable acid addition or quaternary ammonium salt thereof, wherein R^4 is lower alkyl, R^5 is lower alkyl, lower alkenyl, lower alkynyl or cyclopropylmethyl and R^6 is a 1-adamantoyl group.

5. A pharmaceutical composition having analgesic activity comprising an analgesically effective amount of a compound selected from the group consisting of a hexahydroazepine of formula



(II)

and a pharmaceutically acceptable acid addition or quaternary ammonium salt thereof, wherein R^4 is lower alkyl, R^5 is lower alkyl, lower alkenyl, lower alkynyl or cyclopropylmethyl and R^6 is a 1-adamantoyl group in association with a pharmaceutically acceptable carrier.

4,021,551

3,6-BIS-(HETEROCYCLIC AMINOACYL-AMINO)-ACRIDINES AND SALTS THEREOF

Ernest Cullen, Montreal, Canada; Peter Meindl, Vienna, Austria; Hans Tuppy, Vienna, Austria, and Gerhard Bodo, Vienna, Austria, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

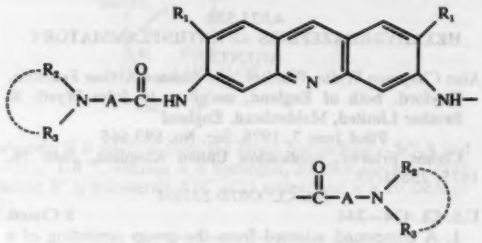
Continuation-in-part of Ser. No. 366,732, June 4, 1973, Pat. No. 3,907,804. This application July 30, 1975, Ser. No. 600,434

Claims priority, application Austria, June 7, 1972, 4878/72

Int. Cl.[2] C07D *401/12, 417/12, 413/12;* **A61K** *31/54*

U.S. Cl. 424—246 **4 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen or methyl,

R_2 and R_3, together with each other and the nitrogen atom to which they are attached, are pyrrolidino, piperidino, methyl-piperidino, hydroxy-piperidino, hydroxymethyl-piperidino, ethoxycarbonyl-piperidino, tetrahydropyridino, hexamethyleneimino, N′-methyl-piperazino, N′-β-hydroxyethyl-piperazino, morpholino, thiomorpholino, S-oxide-thiomorpholino or S,S-dioxido-thiomorpholino, and

A is lower alkylene,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,021,552

10-[ω-(BENZOYLPIPERIDINYL)ALKYL]PHENOTHIAZINES

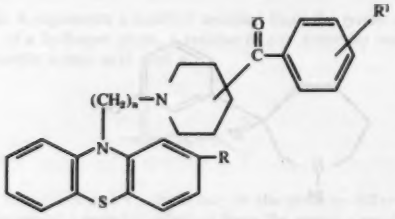
William J. Welstead, Jr., and Robert F. Boswell, Jr., both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation of Ser. No. 591,216, June 27, 1975, abandoned. This application Apr. 20, 1976, Ser. No. 678,575

Int. Cl.[2] C07D *417/06;* **A61K** *27/00*

U.S. Cl. 424—247 **22 Claims**

1. A compound selected from 10-[ω-(benzoylpiperidinyl)alkyl] phenothiazines having the formula:



wherein;

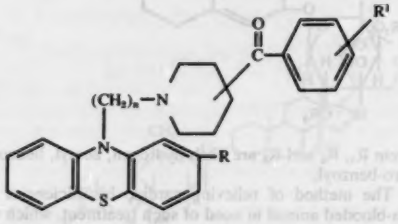
R is selected from the group consisting of hydrogen, bromo, chloro, trifluoromethyl, lower alkoxy, acetyl, sulfamoyl, or dimethylsulfamoyl,

R^1 is selected from the group consisting of hydrogen, chloro, bromo, fluoro, trifluoromethyl, lower alkoxy, or lower alkyl,

n is a positive integer from 2–4 inclusive, and

non-toxic pharmaceutically acceptable acid addition salts thereof.

10. A pharmaceutical composition useful for its tranquilizing properties comprising (a) an effective amount of a 10-[ω-(benzoylpiperidinyl)alkyl]phenothiazine having the formula:



wherein;

R is selected from the group consisting of hydrogen, bromo, chloro, trifluoromethyl, lower alkoxy, acetyl, sulfamoyl or dimethylsulfamoyl,

R^1 is selected from the group consisting of hydrogen, chloro, bromo, fluoro, trifluoromethyl, lower alkoxy or lower alkyl, *n* is a positive integer from 2–4 inclusive, and

(b) a pharmaceutically acceptable carrier therefor.

4,021,553

5,6-DIARYL-1,2,4-TRIAZINES AS TOPICALLY-ACTIVE ANTI-INFLAMMATORY AGENTS

William B. Lacefield, Indianapolis, and Peter P. K. Ho, Carmel, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

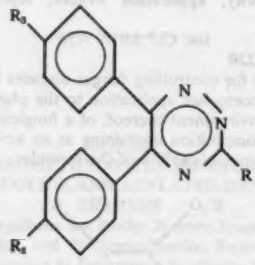
Filed Mar. 10, 1976, Ser. No. 665,590

The portion of the term of this patent subsequent to Apr. 19, 1994, has been disclaimed.

Int. Cl.[2] A61K *31/53*

U.S. Cl. 424—249 **10 Claims**

1. A method of treating inflammation in a warm-blooded mammal which comprises topically administering to such animal an effective amount of a compound of the formula,



wherein R is hydrogen or $-(X)_nR_1$, in which X is either O or S, n is an integer which is either O or 1, and R_1 is C_1–C_8 alkyl, C_7–C_8 aralkyl, C_3–C_8 cycloalkyl, or C_4–C_8 (cycloalkyl)alkyl; and R_2 and R_3 independently are C_1–C_3 alkoxy or di(C_1–C_3 alkyl)amino; and a pharmaceutically-acceptable acid addition salt of basic members thereof.

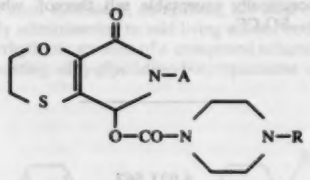
4,021,554

1.4-OXATHIINO[2,3-c]PYRROLE DERIVATIVES

Claude Cotrel, Paris; Claude Jeanmart, Brunoy, and Michel Barreau, Paris, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Nov. 5, 1975, Ser. No. 628,927
Claims priority, application France, Nov. 7, 1974, 74.36962
Int. Cl.² C07D *411/14*
U.S. Cl. 424—250 9 Claims

1. A 1,4-oxathiino[2,3-c]pyrrole derivative of the formula:



wherein A represents a phenyl, 2-pyridyl, 2-quinolyl or 1,8-naphthyridinyl radical, or a said radical substituted by a halogen atom or a methyl, methoxy or nitro radical, and R represents methyl or alkenyl of 2 through 4 carbon atoms.

4,021,555

PHARMACEUTICAL PREPARATION AND METHOD FOR TREATMENT OF PARKINSONISM

Christoph Seyfried, and Herbert Nowak, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Germany

Filed Dec. 16, 1975, Ser. No. 641,350
Claims priority, application Germany, Mar. 29, 1975, 2513940
Int. Cl.² A61K *31/20, 31/495*
U.S. Cl. 424—250 8 Claims

4. A method for enhancing the beneficial effects, for reducing the undesirable effects, or for both enhancing the beneficial effects and reducing the undesirable effects of therapy with L-dopa in the treatment of parkinsonism comprising administering during said therapy an amount of mepiprazole or a pharmacologically acceptable salt thereof, effective to enhance said beneficial effects, to reduce said side effects, or to both enhance said beneficial effects and to reduce said side effects.

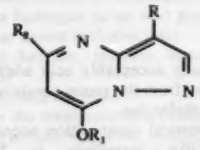
4,021,556

XANTHINE OXIDASE INHIBITORS

Robert H. Springer, Santa Ana; Darrell E. O'Brien, Mission Viejo, and Lionel N. Simon, Santa Ana, all of Calif., assignors to ICN Pharmaceuticals, Inc., Irvine, Calif.

Division of Ser. No. 261,103, June 8, 1972, Pat. No. 3,920,652, which is a continuation-in-part of Ser. No. 172,195, Aug. 16, 1971, abandoned. This application Nov. 17, 1975, Ser. No. 632,809
Int. Cl.² A61K *31/505*
U.S. Cl. 424—251 6 Claims

1. A process for the inhibition of the enzyme xanthine oxidase comprising administering to a patient an oral preparation containing as its active ingredient a compound of the structure



wherein R is phenyl, m-methylphenyl, p-methylphenyl, p-halophenyl, p-acetamidophenyl, 3,4-methylenedioxyphenyl, α-naphthyl, or 3-pyridyl; R_1 is H or an alkali metal or ammonium, and R_2 is H or OR_1 in a total daily dose of approximately 10 to 200 milligrams of the compound.

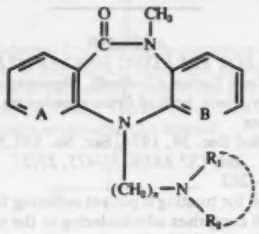
4,021,557

11-AMINOALKYL-PYRIDOBENZODIAZEPINONES AND SALTS THEREOF

Günther Schmidt; Günther Engelhardt, and Sigfrid Püschmann, all of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Filed Apr. 23, 1975, Ser. No. 570,805
Claims priority, application Germany, May 22, 1974, 2424811
Int. Cl.² C07D *471/04*
U.S. Cl. 424—256 26 Claims

1. A compound of the formula



wherein
R_1 is hydrogen, alkyl of 1 to 3 carbon atoms or benzyl,
R_2 is alkyl of 1 to 3 carbon atoms, or
R_1 and R_2, together with each other and the nitrogen atom to which they are attached, are pyrrolidino, piperidino or hexamethyleneimino,
A and B are each nitrogen or =CH—, but other than both nitrogen or =CH— at the same time, and
n is 2 to 3,
or a non-toxic, pharmacologically acceptable acid addition salt thereof.

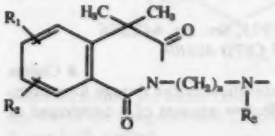
4,021,558

1,3-DIOXO-2-[(METHOXYPHENETHYL-AMINO)-ALKYL]-4,4-DIMETHYL-ISOQUINOLINES AND SALTS THEREOF USEFUL AS HYPOTENSIVE AGENTS

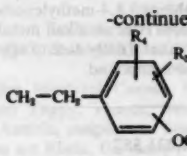
Eberhard Kutter; Volkard Austel, both of Biberach an der Riss; Wolfgang Eberlein, Mettenberg,Biberach, and Joachim Heider, Warthausen-Oberhofen, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 503,072, Sept. 4, 1974, Pat. No. 3,948,898. This application Jan. 22, 1976, Ser. No. 651,568
Claims priority, application Germany, Sept. 8, 1973, 2345422; Sept. 8, 1973, 2345423
Int. Cl.² A61K *31/47*
U.S. Cl. 424—258 4 Claims

1. A compound of the formula



-continued



wherein

R_1 is hydrogen, halogen, methoxy or methylthio,

R_2 is hydrogen or methoxy,

n is 2 or 3,

R_3 is hydrogen or methyl, and

R_4 and R_5 are each hydrogen or methoxy,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

3. The method of lowering the blood pressure of a warm-blooded animal in need of such treatment, which comprises administering to said animal an effective hypotensive amount of a compound of claim 1.

4,021,559

METHOD FOR TREATING SICKLE-CELL ANEMIA

Don Pierre René Lucien Giudicelli, Fontenay-sous-Bois, and Henry Najer, Paris, both of France, assignors to Synthelabo, Paris, France

Filed Dec. 30, 1974, Ser. No. 537,379
Int. Cl.² A61K *31/475, 31/37*
U.S. Cl. 424—262 **3 Claims**

1. A method for treating a patient suffering from sickle-cell anemia, which comprises administering to the said patient the vincamine salt of 6,7-dihydroxycoumarin-4-methylsulphonic acid in an effective amount.

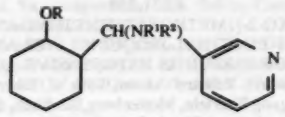
4,021,560

2-[(DIMETHYLAMINO)(3-PYRIDYL)METHYL]CYCLOHEXANOL AND RELATED COMPOUNDS

John P. Yardley, King of Prussia, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Aug. 11, 1975, Ser. No. 603,552
Int. Cl.² C07D *213/38*
U.S. Cl. 424—263 **10 Claims**

1. A compound of the formula:



wherein R is hydrogen, lower alkyl, or lower alkanoyl; R^1 is methyl; and R^2 is methyl, ethyl, or benzyl; or a pharmacologically aceptable acid addition salt thereof.

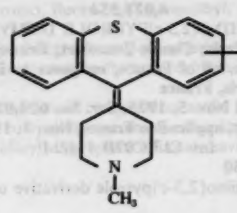
4,021,561

TRIFLUOROMETHYLTHIO- AND TRIFLUOROMETHYLSULFONYL-THIOXANTHEN-9-YLIDENEPIPERIDINES

David C. Remy, North Wales, and Susan F. Britcher, Norristown, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 22, 1975, Ser. No. 642,866
Int. Cl.² C07D *409/04*
U.S. Cl. 424—267 **8 Claims**

1. A pharmaceutical composition in unit dosage form comprising a carrier and an effective amount of a compound of structural formula:



or pharmaceutically acceptable salt thereof, wherein R is $-SCF_3$ or $-SO_2CF_3$.

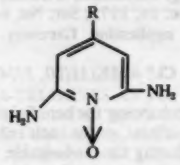
4,021,562

4-TERTIARY-AMINO-2,6-DIAMINOPYRIDINE 1-OXIDES

John E. Lawson, and Ronald D. Dennis, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

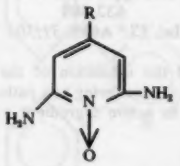
Filed Dec. 8, 1975, Ser. No. 638,473
Int. Cl.² C07D *213/74, 401/04, 413/04, 417/04*
U.S. Cl. 424—267 **9 Claims**

1. A compound having the formula



or a pharmaceutically acceptable acid addition salt thereof wherein R is selected from the group consisting of pyrrolidino, piperidino, and diethylamino.

7. A pharmaceutically acceptable composition for reducing mammalian blood pressure in dosage unit form for systemic administration to a mammal comprising a pharmaceutically acceptable carrier containing from 5 to 500 milligrams of an active ingredient selected from the group consisting of a compound having the formula



or a pharmaceutically acceptable acid addition salt thereof wherein R is selected from the group consisting of pyrrolidine, piperidino, and diethylamino.

8. The pharmaceutical composition according to claim 7 wherein the active ingredient is 2,6-diamino-4-(1-piperidinyl)pyridine 1-oxide.

4,021,563

METHOD OF TREATING CARDIAC ARRHYTHMIA WITH γ-PIPERIDINO-BUTYROPHENONES

Sven Eric Harry Hernestam, AB Ferrosan, P.O. Box S-201 10, Malmo 1, Sweden (S-201 10), and Erling Niels Petersen, 52 Falkehusene, Albertslund, Denmark (DK-2620)

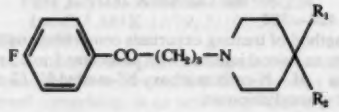
Filed Feb. 2, 1976, Ser. No. 654,728

Claims priority, application United Kingdom, Feb. 6, 1975, 5030/75

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 5 Claims

1. A method of treating arrhythmia in a living animal body in need of such treatment, comprising the step of orally or parenterally administering to said living animal body an effective anti-arrhythmic amount of a compound selected from the group consisting of γ-piperidino-butyrophenone of the formula:



where R_1 and R_2 are independently hydrogen or lower alkyl, having 1 to 4 carbon atoms, and pharmaceutically acceptable acid addition salts thereof.

4,021,564

NEUROLEPTIC PIPERIDINE COMPOUNDS

Sven Erik Harry Hernestam, Malmo; Anders Karl Konrad Björk, Bjarred; Aina Lisbeth Abramo, Malmo, and Bengt Erik Sigvard Kjellberg, Staffanstorp, all of Sweden, assignors to AB Ferrosan, Malmo, Sweden

Filed May 3, 1976, Ser. No. 682,582

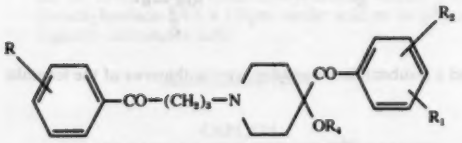
Claims priority, application United Kingdom, May 7, 1975, 19222/75

Int. Cl.² C07D *211/50*

U.S. Cl. 424—267 32 Claims

1. A compound selected from the group consisting of

a. 1-(3-benzoylpropyl)-4-benzoyl-4-hydroxy or -4-acyloxypiperidines having the formula



I

wherein

R_1 and R_2 independently represent hydrogen, a loweralkyl group of one to five carbon atoms inclusive, fluorine, chlorine, bromine, lower-alkoxy of one to five carbon atoms inclusive, or trifluoromethyl,

R_4 represents hydrogen or an acyl group of two to nineteen carbon atoms inclusive, and

R represents fluorine, chlorine, bromine, or trifluoromethyl, and

b. acid addition salts thereof.

32. Method for the treatment of a patient suffering from a psychotic, manic, or neurotic state, comprising administering to the patient a compound of claim 1 in an amount effective for the alleviation of said condition.

4,021,565

PROCESS FOR THE ALLEVIATION OF DEPRESSION BY ADMINISTRATION OF NON-ADDICTING MEPERIDINE ANALOGUES

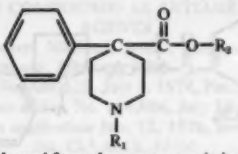
Frank M. Berger, 190 E. 72nd St., New York, N.Y. 10021

Continuation of Ser. No. 566,587, April 8, 1975, abandoned. This application Jan. 29, 1976, Ser. No. 653,804

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 10 Claims

1. A method of treating an animal having depression which comprises administering to the animal an amount effective to ameliorate depression of a compound selected from the group consisting of a compound having the formula:



in which R_1 is selected from the group consisting of lower alkyl having from one to four carbon atoms and allyl and R_2 is alkyl having from one to two carbon atoms; but if R_1 is methyl or ethyl, R_2 is other than ethyl; and the compound in the form of a pharmaceutically acceptable salt thereof.

4,021,566

2,5-DIMETHYL-1-PYRROLE-LOWER-ALKANECARBOXAMIDES

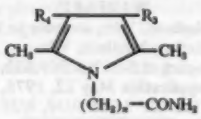
Malcolm Rice Bell, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,335

Int. Cl.² A61K *31/40*

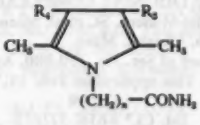
U.S. Cl. 424—274 8 Claims

1. A 2,5-dimethyl-3-R_3-4-R_4-1-pyrrole-lower-alkanecarboxamide having the formula:



where R_3 and R_4 are either both hydrogen or both methyl, and n is one of the integers 1 and 2, except that when n is 2, R_3 and R_4 are both methyl.

6. A method of reducing gastric secretion and incidence of ulcer formation in humans comprising administering orally an effective anti-secretory/anti-ulcer amount of a 2,5-dimethyl-3-R_3-4-R_4-1-pyrrole-lower-alkanecarboxamide according to claim 1 having the formula:



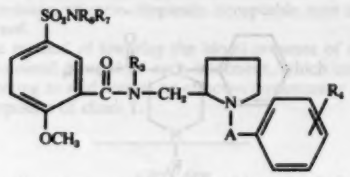
where R_3 and R_4 are either both hydrogen or both methyl, and n is one of the integers 1 and 2, except that when n is 2, R_3 and R_4 are both methyl.

4,021,567
2-METHOXY-BENZAMIDE DERIVATIVES

Jean Pierre Kaplan, Le Plessis-Robinson; Bernard Michel Raizon, Vigneux-sur-Seine; Daniel Charles Leon Obitz, Orsay; Philippe Michel Jacques Manqury, L'Hay-les-Roses; Henry Najer; Maurice Jalfre, both of Paris, and Don Pierre Rene Lucien Giudicelli, Fontenay-sous-Bois, all of France, assignors to Synthelabo, Paris, France

Filed Dec. 16, 1975, Ser. No. 641,180
Claims priority, application France, Dec. 18, 1974, 74.41718
Int. Cl.² A01N 9/22
U.S. Cl. 424—274 10 Claims

1. A compound of the formula



wherein

A is a linear or branched alkylene chain of 1 to 4 carbon atoms;

R_3 is hydrogen or alkyl of 1 to 4 carbon atoms;

R_4 is hydrogen, halogen, trifluoromethyl, alkoxy of 1 to 3 carbon atoms or alkyl or 1 to 3 carbon atoms; and

each of R_6 and

R_7 is independently hydrogen or alkyl of 1 to 4 carbon atoms

in the form of a racemate or optical isomer, or a pharmaceutically acceptable acid addition salt of said racemate or optical isomer.

9. A pharmaceutical agent capable of treating nervous and psychosomatic disorders which comprises an effective amount of the compound of claim 1 for treating said nervous and psychosomatic disorders and a compatible pharmaceutically acceptable carrier.

4,021,568
RODENTICIDAL COMPOSITIONS CONTAINING 2-CHLORO-3-PHYTYL-1,4-NAPHTHAQUINONE AND WARFARIN

John W. Suttie, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of Ser. No. 359,632, May 14, 1973, abandoned. This application May 12, 1975, Ser. No. 576,347
Int. Cl.² A01N 9/24, 9/28
U.S. Cl. 424—281 2 Claims

1. A rodenticide suitable against rat populations including anticoagulant rodenticide-resistant rats, said rodenticide containing, as the essential rodenticidal ingredients, 2-chloro-3-phytyl-1,4-naphthaquinone in an amount about 0.02% by weight and warfarin or its water soluble sodium salt in an amount about 0.025% by weight.

4,021,569
METHOD OF NUTRITIONAL SUPPLEMENTATION FOR ZINC AND METHIONINE BY INGESTING 1:1 ZINC METHIONINE COMPLEXES

Mahmoud M. Abdel-Monem, St. Paul, Minn., assignor to Zinpro Corporation, Chaska, Minn.

Continuation-in-part of Ser. No. 390,080, Aug. 20, 1973, Pat. No. 3,941,818. This application Feb. 11, 1976, Ser. No. 657,189
Int. Cl.² A61K 31/315
U.S. Cl. 424—289 5 Claims

1. A method of enhancing the nutrition and health of animals and humans by effectively increasing the absorption, distribution and utilization of zinc and methionine within the body system of said animals and humans, said method comprising feeding, as a dietary supplement of zinc and methionine, a diet supplementing effective amount of complexed salts of the formula:

$$[CH_3SCH_2CH_2CH(NH_2)COO^{-}.Zn^{++}]_wX$$

wherein X is an anion which does not interfere with the effective increasing of absorption, distribution and utilization of zinc and methionine within the body system, and w is an integer equal to the anionic charge of X.

4,021,570
TREATMENT OF OXYURIASIS

Mohammad Mehdi Nafissi-Varchei, North Caldwell, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Apr. 20, 1976, Ser. No. 678,776
Int. Cl.² A61K 31/27
U.S. Cl. 424—300 1 Claim

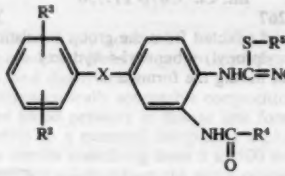
1. A method of treating oxyuriasis comprising orally administering to an animal infected with pinworms 5 to 25 mg per kg per day of N-carbomethoxy-N'-methyl-N'-(2-nitro-4-n-propyloxyphenyl)thiourea.

4,021,571
SUBSTITUTED PHENYLISOTHIOUREAS AND PROCESSES FOR THEIR PREPARATION AND USE

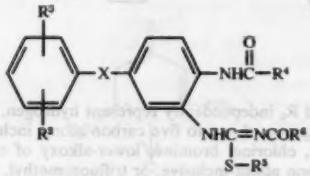
Heinrich Kolling, Haan; Herbert Thomas, Wuppertal; Arno Widdig, Biecher, and Hartmund Wollweber, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 595,040, July 11, 1975. This application June 4, 1976, Ser. No. 693,097
Claims priority, application Germany, July 16, 1974, 2434183
Int. Cl.² A01N 9/12
U.S. Cl. 424—300 20 Claims

1. A compound selected from the group consisting of a 4-substituted-2-amidophenylisothiourea of the formula:



and a 5-substituted-2-amidophenylisothiourea of the formula:



wherein X is sulfur, sulfinyl or sulfonyl;

R^4 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms;

R^5 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or alkynyl of 2 to 6 carbon atoms; and

R^6 is alkoxy of 1 to 6 carbon atoms, alkenyloxy of 2 to 6

carbon atoms, alkynyloxy of 2 to 6 carbon atoms, or alkoxyalkoxy of 2 to 12 carbon atoms:

each of R^2 and R^3 independent of the other is hydrogen, halogeno, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms, trifluoromethyl, alkanoyl of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms, or carbalkoxy of 2 to 7 carbon atoms.

19. A pharmaceutical composition comprising an anthelmintically effective amount of a compound according to claim 1 and a pharmaceutically acceptable diluent or carrier.

4,021,572
PROPHYLACTIC AND THERAPEUTIC TREATMENT OF ACNE VULGARIS UTILIZING LACTAMIDES AND QUATERNARY AMMONIUM LACTATES

Eugene J. Van Scott, 1138 Sewell Lane, Rydal, Pa. 19046, and Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128

Filed July 23, 1975, Ser. No. 598,224
Int. Cl.² A61K *31/19, 31/16, 31/14*
U.S. Cl. 424—317 28 Claims

1. A non-irritating therapeutic composition for alleviating the symptoms of acne in humans and for preventing the recurrence thereof comprising: as an active ingredient, a therapeutically effective amount of a product prepared by reacting, in aqueous or alcoholic aqueous solution at room temperature, lactic acid or lactic anhydride and a base selected from the group consisting ammonium hydroxide, an organic primary, secondary, or tertiary alkylamine, alkanol amine, diamine, dialkylamine, dialkanolamine, alkylalkanol amine, trialkylamine, trialkanol amine, dialkyl alkanol amine, and alkyl dialkanolamine wherein the alkyl or alkanol substituent has from 1 to 8 carbon atoms, in a pharmaceutically acceptable vehicle for topical application.

4,021,573
PSORIASIS TREATMENT WITH RETINOIC ACID ANALOGS

Kwan-Hua Lee, San Francisco, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Division of Ser. No. 463,078, April 22, 1974, Pat. No. 3,934,028. This application Nov. 5, 1975, Ser. No. 629,204
Int. Cl.² A61K *31/20*
U.S. Cl. 424—318 7 Claims

1. A method for treating a host having psoriasis, which comprises administering to the host either topically or internally an effective amount for remission of psoriasis of 11-(2′, 6′, 6′-trimethylcyclohex-1′-enyl-1′)-5,9-dimethylundeca-2,4,6,8,10-pentenoic acid or its physiologically acceptable salts.

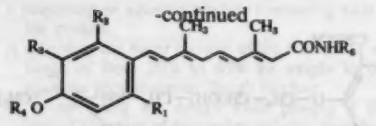
4,021,574
ANTIDANDRUFF COMPOSITIONS CONTAINING 9-(4-LOWER ALKOXY-2,3,6-TRILOWER-ALKYLPHENYL)-3,7-DIMETHYL-NONA-2,4,6,8-TETRAEN-1-OIC ACID LOWER ALKYL AMIDES

Werner Bollag, Basel; Rudolf Ruegg, Bottmingen, and Gottlieb Ryser, Basel, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Sept. 9, 1975, Ser. No. 611,726
Claims priority, application Switzerland, Sept. 24, 1974, 12921/74
Int. Cl.² A61K *31/165*
U.S. Cl. 424—324 12 Claims

1. A composition for application to the hair and scalp for the treatment of dandruff comprising a pharmaceutically acceptable hair lotion or dressing containing, as an active ingredient, from about 0.005% by weight to about 0.2% by weight of a compound represented by the formula

-continued



I

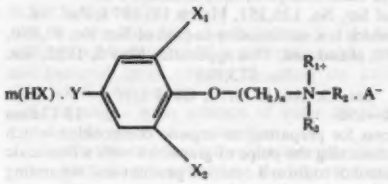
wherein R_1, R_2, R_3, R_4 and R_5 are lower alkyl.

4,021,575
SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS AS ANTIARRHYTHEMIC AGENTS

Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 484,525, July 1, 1974, Pat. No. 3,932,664, which is a division of Ser. No. 164,086, July 19, 1971, Pat. No. 3,875,215. This application Jan. 12, 1976, Ser. No. 648,549
Int. Cl.² A61K *31/14*
U.S. Cl. 424—329 8 Claims

5. A method for combatting cardiac arrhythmias which comprises administering to an animal a cardiac antiarrhythmic amount of a quaternary ammonium compound corresponding to the formula:



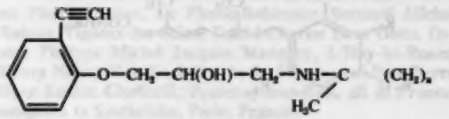
wherein Y represents amino, loweralkylamino or diloweralkylamino; R_1 and R_2 represent lower alkyl; R_3 independently represents substituted lower alkyl, substituted lower alkenyl or substituted lower alkynyl substituted with halogen; X_1 and X_2 both represent halogen; A^- represents a stoichiometric equivalent quantity of a pharmaceutically-accptable anion; *n* represents one of the integers 2, 3 or 4; HX represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable acid; and *m* represents one of the integers zero and one.

4,021,576
PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-(2′-ETHYNYL-PHENOXY)-2-HYDROXY-3-(CYCLOALKYL-AMINO)-PROPANE AND METHOD OF USE

Herbert Köppe; Werner Kummer; Helmut Stähle; Karl Zeile, all of Ingelheim am Rhein; Albrecht Engelhardt, Mainz, and Werner Taunecker, Munster-Sarmsheim, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

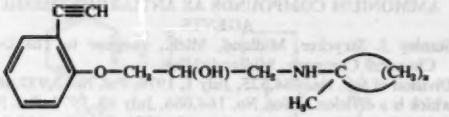
Division of Ser. No. 310,638, Nov. 29, 1972, Pat. No. 3,937,706, which is a continuation-in-part of Ser. No. 57,353, July 22, 1970, Pat. No. 3,755,413. This application Dec. 10, 1975, Ser. No. 639,342
Claims priority, application Germany, July 23, 1969, 1937477
Int. Cl.² A61K *31/135*
U.S. Cl. 424—330 6 Claims

1. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective β-adrenolytic amount of the compound of the formula



wherein *n* is 4 or 5, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4. The method of blocking β-adrenergic receptors in a warm-blooded animal in need of such treatment, which comprises administering to said animal an effective β-adrenolytic amount of a compound of the formula



wherein *n* is 4 or 5, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,021,577

USEFUL PRODUCT DERIVED FROM GRAPEFRUIT PULP AND PROCESS FOR PREPARING THE SAME

Jakob Harich, and Franz P. Harich, both of Orlando, Fla., assignors to Rush-Hampton, Inc., Orlando, Fla.

Division of Ser. No. 126,251, March 19, 1971, Pat. No. 3,890,212, which is a continuation-in-part of Ser. No. 27,080, April 9, 1970, abandoned. This application May 2, 1975, Ser. No. 573,900

Int. Cl.² A61K *35/78*; **G01J** *1/10*

U.S. Cl. 424—195 **13 Claims**

1. A process for preparing an organic composition which comprises contacting the pulps of grapefruit with a non-toxic polyhydric alcohol to form a reaction product and separating this product from the pulp residue.

4,021,578

COSMETIC AND SKIN CONDITIONING COMPOSITION

Jakob Harich, and Franz P. Harich, both of Orlando, Fla., assignors to Rush-Hampton, Inc., Orlando, Fla.

Division of Ser. No. 126,251, March 19, 1971, Pat. No. 3,890,212, which is a continuation-in-part of Ser. No. 27,080, April 9, 1970, abandoned. This application May 8, 1975, Ser. No. 575,983

Int. Cl.² A61K *7/00*, *47/00*, *31/045*

U.S. Cl. 424—364 **10 Claims**

1. A method for conditioning animal or human skin which comprises applying to the skin an organic reaction product obtained by contacting the pulps of grapefruit with a non-toxic polyhydric alcohol to form said reaction product and separating the resultant organic reaction product from the pulp residue.

4. A cosmetic composition comprising an admixture of a cosmetic base with from about 0.5% to 2% by weight of a composition obtained by contacting the pulps of grapefruit with a non-toxic polyhydric alcohol to form a reaction product and separating the product from the pulp residue.

4,021,579

ACCELERATED PRODUCTION OF FERMENTED ALCOHOLIC BEVERAGES

Harold F. Barrett, 5550 Columbia Pike, Arlington, Va. 22204

Continuation-in-part of Ser. No. 252,656, May 12, 1972, abandoned. This application Nov. 20, 1975, Ser. No. 633,974

Int. Cl.² C12G *1/00*, *3/00*

U.S. Cl. 426—11 **2 Claims**

1. A method of fermenting and aging a fermentable mixture, comprising; introducing a volume of fermentable mixture into a larger volume batch container; sealing said container with respect to atmosphere; removing the atmosphere from the unfilled volume of said container and substantially instantaneously pressurizing said unfilled volume with fermentation gases, independent from said fermentable mixture, to an accelerating pressure level substantially greater than one atmosphere to accelerate a primary fermentation reaction exhibiting net mass flow of fermentation gases from said mixture into said unfilled container volume; allowing said primary fermentation reaction to proceed and increase the gaseous pressure within said container above the lower limits of an aging pressure range above said accelerating pressure level; steps for maintaining said gaseous pressure in said container within said aging pressure range during said primary fermentation reaction; said steps including periodically reducing said gaseous pressure as the same approaches the upper limit of said aging pressure range; continuing said steps until termination of said primary fermentation is exhibited by a shift of net mass fermentation gas flow from said unfilled container volume into said mixture; terminating the reduction of gaseous pressure within said aging pressure range; maintaining said container sealed with respect to atmosphere; steps for accelerating aging of said mixture; said last named steps including allowing the fermentation gases within said unfilled container to be driven into said mixture and decrease the gaseous pressure within said container below said accelerating pressure level; and continuing said last named steps until the pressure in said container drops substantially below one atmosphere.

4,021,580

PREPARATION OF AN ALCOHOLIC MALT BEVERAGE BASE

Leonard Raymond, White Plains, N.Y.; John B. Bockelmann, Tenafly, N.J., and William Tirado, Jr., Oceanside, N.Y., assignors to The F. & M. Schaefer Brewing Company, Brooklyn, N.Y.

Continuation-in-part of Ser. No. 562,934, March 28, 1975, abandoned. This application Mar. 22, 1976, Ser. No. 669,514

Int. Cl.² C12C *7/00*, *11/04*

U.S. Cl. 426—16 **1 Claim**

1. A method for the production of an alcoholic malt beverage base which comprises

preparing an all malt mash,

draining the mash to obtain the first wort having a percent solids content of about 18° to about 24° P.,

adding fermentable sugar to the first wort in an amount such that the percent solids present is made up of from about 60% to about 40% solids from the malt and from 40% to about 60% solids from the fermentable sugar and subjecting the wort to boiling, the percent solids in the wort after boiling being from about 30° to about 32° P.,

adjusting the percent solids in the wort by addition of water to a value of from about 28.5° to about 29.5° P.,

cooling the wort,

initiating fermentation in the wort with brewers yeast at a temperature of about 52° F and a pitching rate of about 1.75 pounds of yeast per barrel of wort,

continuing the fermentation at a temperature of about 52° F for a period of about 10 to 12 hours,

adding additional brewers yeast in an amount of from about 0.25 to about 0.5 pounds per barrel of wort and continuing the fermentation for an additional time of about 60 hours while permitting the temperature to rise to about 65° F,

continuing fermentation while maintaining the temperature at about 65° F to the desired end point,

cooling the fermented wort,

separating the solids therefrom and decanting off and filtering the liquid to obtain the desired malt beverage base having an alcohol content ranging from about 5.5% to about 9% by weight.

4,021,581

CULTURE OF SOUR DOUGH BACTERIA

Edmond L. Sing, 3860 Cheviot Place, Indianapolis, Ind. 46226

Filed Oct. 17, 1975, Ser. No. 623,449
Int. Cl.² C12K 3/00; A21D 8/04
U.S. Cl. 426—61 5 Claims

1. A process for growing and storing the bacterial species *Lactobacillus sanfrancisco* which comprises:
   a. incubating a first mixture of
      1. enzyme digested non fat dry milk
      2. malt syrup
      3. an unsaturated fatty acid derivative
      4. fresh yeast extractives and
      5. *Lactobacillus sanfrancisco* at about 30° C while maintaining the pH at about 4.7 by the addition of alkali;
   b. after incubating, mixing about 9 parts of the first mixture with about 5 parts of a second mixture of
      1. glycerol
      2. nonfat dry milk
      3. saccharide
      4. an unsaturated fatty acid derivative and
      5. monosodium glutamate;
   c. cooling the mixture to about 0° C and then maintaining the temperature for at least about 20 minutes; and
   d. after said maintaining, cooling the mixture to below about −30° C.

3. An improved process for growing the bacterial species *Lactobacillus sanfrancisco* which comprises the growing of both strain 114-3 and strain F-3 in combination in a suitable liquid medium for growth.

4,021,582

WATER-DISPERSIBLE COMPOSITION AND PROCESS FOR PRODUCTION

Jau Yann Hsu, Brookfield, Conn., assignor to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Feb. 13, 1976, Ser. No. 657,759
Int. Cl.² A23L 1/00
U.S. Cl. 426—99 10 Claims

1. A water-dispersible edible composition comprising an intimate admixture of co-agglomerates of a finely-divided non-dispersible material and a silicon dioxide flow agent, said co-agglomerates having a thin coating of edible fat over their external surfaces.

4,021,583

FRUIT-FLAVORED FROZEN CONFECTION AND METHOD OF MAKING THE SAME

Sidney Arden, Lawrence, N.Y., assignor to Consolidated Foods Corporation, Englewood, N.J.

Filed Nov. 10, 1975, Ser. No. 630,232
Int. Cl.² A23G 9/00
U.S. Cl. 426—134 13 Claims

9. A quiescently frozen confection comprising a quiescently frozen solution containing fruit puree from about 10 to 40 weight percent of said solution, sweetener from about 8 to 20 weight percent of said solution and water in an amount such that said solution has a total solids content of about 21 to 25 weight percent.

4,021,584

PROCESS FOR FIBERED MEAT ANALOGS

Marshall Miles Rankowitz, Hartsdale, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Filed Aug. 6, 1975, Ser. No. 602,347
Int. Cl.² A23J 3/00
U.S. Cl. 426—242 2 Claims

1. An improved process for preparing a meat analog comprising the steps of:
   a. forming a plurality of substantially unpuffed, fibrous protein strips by:
      i. preparing an aqueous mixture containing heat coagulable protein,
      ii. adjusting the water content of the mixture to within the range of from 20% to 65% by weight to obtain an aqueous proteinaceous dough mixture,
      iii. compressing the dough while passing it through a heated chamber of decreasing volume, thereby simultaneously elongating and heating the dough while under compression to form thermally coagulated fibrous strips having fiber alignment in the direction of the channel, and
      iv. releasing the compression on the strips such that they are not substantially puffed and maintain the fibrous nature;
   b. fibrilating the strips to partially separate the fibers within the strips;
   c. soaking the strips in a binder medium comprising egg albumen;
   d. layering the strips to align the fibers and to substantially eliminate voids; and
   e. heat setting the binder.

4,021,585

CHLORINE DIOXIDE SPRAY PROCESS FOR CHILLING MEAT CARCASSES

Donald J. Svoboda, Florissant, and Loretta E. Schwerdt, St. Peters, both of Mo., assignors to Krey Packing Company, St. Louis, Mo.

Filed Jan. 16, 1976, Ser. No. 649,912
Int. Cl.² A23B 4/00, 4/14
U.S. Cl. 426—332 3 Claims

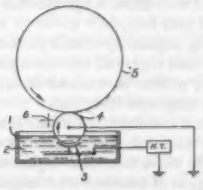
1. As a non-bleaching use of chlorine dioxide, the method of chilling freshly slaughtered hog carcasses while maintaining an anti-bacterial spray without bleaching the carcass surface skin, which comprises:
   A. forming a spray solution of water containing chlorine dioxide gas in a concentration
      i. effective to prevent the protein synthesis mechanism of bacteria encountered on the hog carcass skin surface, but
      ii. ineffective to bleach the skin pigment; and
   B. conveying said hog carcasses to a chilling room and chilling said hog carcasses;
   C. intermittently spraying such solution onto said hog carcasses during the period of their chilling for a period long enough to prevent the protein synthesis mechanism, but not long enough to bleach.

4,021,586

METHOD OF AND MEANS FOR THE DEVELOPMENT OF ELECTROSTATIC IMAGES

Josef Matkan, Malvern, Australia, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 187,002, Oct. 6, 1971, abandoned.
This application Oct. 17, 1973, Ser. No. 407,167
Claims priority, application Australia, Oct. 8, 1970, 2791/70
Int. Cl.² G03G 13/10
U.S. Cl. 427—17 12 Claims



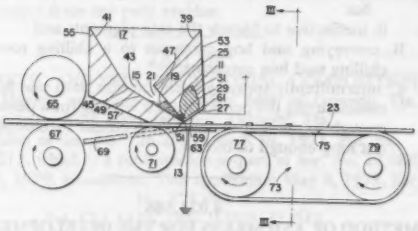
1. In the method for developing electrostatic latent images

comprising the steps of immersing a portion of a toner transport member in a body of insulating liquid dispersed toner particles, electrodepositing said toner particles onto at least part of said immersed portion of said toner transport member, moving said toner transport member to cause the toner deposit contained on its surface to contact the latent electrostatic image bearing surface of a recording member to develop said latent electrostatic image while said recording member and said toner transport member are moving at the same speed in relation to each other, and reimmersing said portion of said toner transport member in said body of insulating liquid dispersed toner to further electrodeposit toner particles thereon, wherein the improvement comprises maintaining said recording member in spaced relationship with respect to said body of insulating liquid dispersed toner particles, and depressing the insulating carrier liquid contained within the toner deposit on said toner transport member before said transport member contacts the latent electrostatic image bearing surface of the recording member by applying a voltage to a corona generating means positioned adjacent said toner transport member.

4,021,587
MAGNETIC AND ELECTROSTATIC TRANSFER OF PARTICULATE DEVELOPER

Harold J. Banker, Bethel Park, Pa., assignor to Pram, Inc., Wilmerding, Pa.

Division of Ser. No. 490,969, July 23, 1974, Pat. No. 3,939,800. This application Feb. 12, 1976, Ser. No. 657,606
Int. Cl.² B05D *1/06*
U.S. Cl. 427—18 **4 Claims**



1. A process for depositing electrostatically and magnetically responsive particulate matter on a conductive surface bearing a latent image comprising:

a. producing a magnetic field having a region of concentrated magnetic flux that permeates said conductive surface and a region of dilute magnetic flux that is inclined and generally adjacent to said conductive surface;

b. said concentrated flux also permeating a slot outlet disposed at the bottom of a hopper for said particulate matter and said dilute magnetic flux permeating an upper portion of said hopper;

c. introducing a quantity of said particulate matter into said hopper to said region of dilute magnetic flux; whereby the particulate matter is retained at said outlet by said concentrated magnetic flux; and,

d. placing said conductive surface into said region of concentrated magnetic flux whereby said particulate matter is caused to move from said region of dilute magnetic flux to said region of concentrated magnetic flux by the forces of magnetism and gravity and thence to said conductive surface by electrostatic forces.

4,021,588
METHOD FOR PREPARING FILTER-COATED PHOSPHOR PARTICLES

Martin Robert Royce, Lancaster, and Robert Paul Thompson, Millersville, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 23, 1976, Ser. No. 651,919
Int. Cl.² B23K *31/02*
U.S. Cl. 427—215 **10 Claims**

1. A method for coating phosphor particles with discrete filter particles comprising

a. suspending said phosphor particles in a liquid medium,

b. precipitating on said phosphor particles only sufficient filter material to cover surfaces of said phosphor particles, said filter material being a chalcogenide selected from the group consisting of sulfides, selenides and/or tellurides of at least one bivalent cation selected from the group consisting of cadmium, zinc, calcium magnesium, strontium and/or barium,

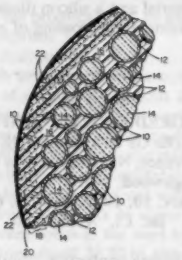
c. removing said covered phosphor particles from said liquid medium

d. and then heating said covered phosphor particles in a nonoxidizing ambient until said filter material sinters to the surfaces of said phosphor particles as discrete filter particles.

4,021,589
BUOYANCY MATERIALS

John R. Copley, Canton, Mass., assignor to Emerson & Cuming, Inc., Canton, Mass.

Filed Apr. 28, 1976, Ser. No. 681,207
Int. Cl.² B32B *3/26*
U.S. Cl. 428—68 **17 Claims**



10. A buoyant structure comprising a plurality of implodable buoyant bodies encased in a matrix of syntactic foam having a specific gravity less than 1.0, said foam comprising a hardenable resin and a multiplicity of hollow microspheres, wherein the improvement comprises a layered skin comprising, in combination

an inner layer of said syntactic foam having a thickness capable of preventing implosion of buoyant bodies in the outer portions of said matrix at a desired hydrostatic pressure, and

an outer layer of permeable reinforcing material permeated with a member selected from the group consisting of said syntactic foam, the hardenable resin component of said snytactic foam, and mixtures thereof for protecting said inner layer and said buoyant bodies from impact damage, the hardenable resin in said layers being intergral with said matrix.

4,021,590

METHOD OF MANUFACTURING A CONTACT BODY

Hakan Vangbo, Jarfalla, Sweden, assignor to Aktiebolaget Carl Munters, Sollentuna, Sweden

Filed Apr. 1, 1975, Ser. No. 564,115

Claims priority, application Sweden, Apr. 9, 1974, 7404817-4

Int. Cl.² B32B 3/28, 19/08; B05D 3/04, 3/02

U.S. Cl. 428—186 11 Claims

1. A method of manufacturing a contact body comprising the steps of, forming layers of asbestos fibers arranged so that the layers bear against one another at mutually spaced positions to provide a plurality of channels in the body extending from end to end, adding to said asbestos fibers, either before or after said forming step, a predetermined quantity of a silicon compound and an aluminum compound thereafter heating the body together with said silicon and aluminum compounds to sintering temperature; said adding step including the step of adjusting the addition of the silicon and aluminum compounds so that in the sintered layers the ratio by weight of the oxide of silicon to the oxides of aluminum and magnesium is in the range of 45–55% SiO_2, 30–45% Al_2O_3 and 10–20% MgO.

4,021,591

SUBLIMATION TRANSFER AND METHOD

Roy F. DeVries, Oakland, N.J., and William H. Snyder, II, Staten Island, N.Y., assignors to Roy F. DeVries, Oakland, N.J.

Filed Dec. 4, 1974, Ser. No. 529,449

Int. Cl.² B32B 7/12; D06P 3/60

U.S. Cl. 428—200 30 Claims

1. A dry release sublimation transfer comprising a temporary backing sheet, said backing sheet having deposited thereon a sublimation transfer design layer comprised of one or more sublimation transfer inks having a sublimation point between about 100° and 300° C., and a discrete polymeric layer disposed in contact with said design layer, said polymeric layer comprising a polymer having a glass transition temperature within the range of from about −20° C. to about 50° C., a thickness of between about 0.1 and 20 mils, and having a softening point within the transfer range of said sublimation transfer inks, said polymer being selected from the group consisting of copolymers of butyl acrylate and methyl acrylate, acrylonitrilebutadiene-styrene terpolymers, copolymer of vinyl isobutyl ether and methyl methacrylate, copolymers of ethyl acrylate and methyl methacrylate, copolymers of ethyl acrylate and butyl methacrylate, copolymers of vinyl acetate and butyl acrylate, methyl acrylate polymers, copolymers of vinyl chloride and ethylene, copolymers of butyl acrylate and methyl methacrylate, copolymers of butyl acrylate and butyl methacrylate, copolymers of ethylene and vinyl acetate, copolymers of styrene and 1,3-butadiene, copolymers of vinyl isobutyl ether and methyl methacrylate, poly n-butyl methacrylate, poly n-propyl methacrylate, polyethyl methacrylate, polyvinyl chloride, polyacrylonitrile, polystyrene, polymethyl methacrylate, polyethyl acrylate, poly n-propyl acrylate and poly n-butyl acrylate whereby upon the application of said dry release sublimation transfer under heat and pressure to a cotton-containing textile substrate to be decorated, said polymeric layer is adapted to soften and penetrate into said substrate, and said design layer is transferre to said substrate, and upon cooling securely bonds said design layer to said textile substrate.

14. The method as defined in claim 13 wherein said temporary backing sheet includes a release coating to facilitate release of said design layer and polymeric layer from said temporary backing sheet upon application of heat thereto.

4,021,592

PROCESS OF MAKING ELECTROPLATED ANODIZED ALUMINUM ARTICLES AND ELECTROLESS PLATING

Howard A. Fromson, Rogues Ridge Road, Weston, Conn. 06880

Continuation of Ser. No. 449,162, March 7, 1974, Pat. No. 3,929,594, which is a continuation-in-part of Ser. No. 361,720, May 18, 1973, Pat. No. 3,865,700. This application Oct. 15, 1975, Ser. No. 622,544

Int. Cl.² C25D 5/44

U.S. Cl. 428—209 22 Claims

1. Process for electroless plating metals onto a non-conductive substrate which comprises laminating a non-conductive layer to an aluminum article having an aluminum substrate, a porous anodic oxide layer on the substrate and electrolytically deposited, randomly distributed discrete metal islands having a root portion anchored in one or more pores of the oxide layer, said islands extending from the root portion above the surface of the oxide layer thereby forming a composite anodized and discontinuously electroplated surface, such that said non-conductive material surrounds said metal islands extending above the surface of the oxide layer, thereafter removing the aluminum substrate and the anodic oxide layer thereon leaving behind said discrete metal islands imbedded in the non-conductive material, said imbedded metal islands being adapted to serve as nucleating sites for a subsequent electroless deposition of metal coatings.

4,021,593

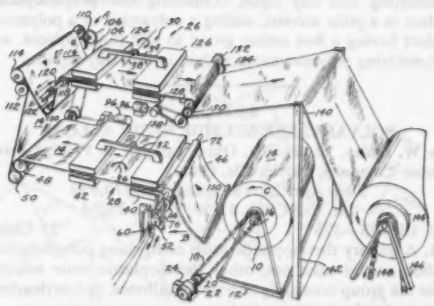
NEEDLED FABRIC STRUCTURE

Alexander M. Smith, II, Elkin, N.C., assignor to The Fiberwoven Corporation, Elkin, N.C.

Division of Ser. No. 371,725, June 20, 1973, Pat. No. 3,906,599, which is a continuation-in-part of Ser. No. 221,614, Jan. 28, 1972, Pat. No. 3,817,820. This application Apr. 10, 1975, Ser. No. 567,010

Int. Cl.² B32B 5/06

U.S. Cl. 428—300 5 Claims



1. A needled fabric structure characterized by having high tensile strength after needling with an improved fiber entanglement comprising: a needled batt having fibers therein coherently oriented throughout the batt from one surface thereof to the other surface in a plurality of rows of fibers extending in a generally lengthwise direction of the batt, each of said rows being a substantially continuous chain entanglement of fibers from one surface to the other surface and back again throughout the lengthwise direction of the batt with each of the rows of chain entanglement of fibers having an oscillating configuration in plan elevation of the batt, and at least some of said rows of chain entanglement of fibers of the

batt crossing, recrossing and extending through other of said rows of chain entanglement of fibers as the rows of chain entanglement of fibers extend in a lengthwise direction and oscillate in a widthwise direction as they also extend from one surface to the other surface and back again throughout the length of the batt.

4,021,594

POLYMER COATED REGENERATED CELLULOSE FILM CONTAINING CELLULOSE FIBERS IN THE COATING

John N. Godfrey, Asheville, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.

Filed Apr. 2, 1976, Ser. No. 673,266
Int. Cl.[2] B32B *23/00*
U.S. Cl. 428—303 5 Claims

1. In a regenerated cellulose film coated on at least one surface with a continuous polymer coating composition selected from the group consisting of vinylidene chloride coating compositions and nitrocellulose coating compositions, the improvement comprising evenly distributing in the coating composition from 0.25 to 4% by weight, based on the weight of the coating, of cellulose fiber having an average particle fiber length within the range of from 10 to 150 microns.

4,021,595

PRESSURE SENSITIVE RECORDING SHEET

Masataka Kiritani; Hiroharu Matsukawa; Akio Watanabe, and Hitoshi Imamiya, all of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Division of Ser. No. 283,470, Aug. 24, 1972, Pat. No. 3,886,085. This application Jan. 16, 1975, Ser. No. 541,555
Claims priority, application Japan, Aug. 31, 1971, 46-66757
Int. Cl.[2] B32B *3/26*
U.S. Cl. 428—307 9 Claims

1. A pressure sensitive recording sheet having thereon a layer of the fine oil microcapsules produced by the process which comprises dissolving in an oily liquid containing a substantially colorless color former capable of reacting with a developer to form a colored product a polyisocyanate adduct having a free isocyanate group, said polyisocyanate adduct being an adduct of hexamethylene diisocyanate and trimethylolpropane, an adduct of tolylenediisocyanate and trimethylolpropane or a xylylene diisocyanate adduct, said adduct having both an olephilic group and a hydrophilic group, dispersing or emulsifying said oily liquid containing said polyisocyanate adduct in a polar solvent, adding a polyamine or a polyamine adduct having a free amino group to said polar solvent, and polymerizing polyisocyanate adduct in said oily liquid.

4,021,596

POLYARYLENE SULFIDE RESIN ALLOYS

Fay W. Bailey, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 22, 1975, Ser. No. 570,932
Int. Cl.[2] C08L *67/00, 71/04, 81/04*
U.S. Cl. 428—375 25 Claims

1. A unitary thermoplastic mass comprising polyphenylene sulfide and at least one other thermoplastic resin selected from the group consisting of polyarylsulfones, polyarylcarbonates, and polyphenylene oxides.

4,021,597

SEA WATER BATTERY WITH A LEAD CHLORIDE CATHODE AND METHOD OF MAKING THE SAME

Leonard Joseph Burant, Milwaukee, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

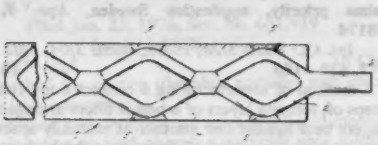
Filed Jan. 28, 1976, Ser. No. 653,270
Int. Cl.[2] H01M *6/34*
U.S. Cl. 429—119 14 Claims

1. A predischarge cathode for use in fabricating a seawater battery cell, comprising:

a metallic grid having peak and valley surfaces, said grid being formed of a metal which is stable in a lead chloride seawater battery system;

terminal means electrically connected to said grid;

a coating of lead chloride supported on said grid surfaces, said coating having an outer reaction surface; and



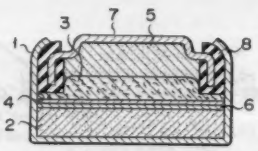
a matrix to conductive lead formed in situ to provide initial current flow intermediate portions of said coating outer reaction surface and contiguous peaked portions of said grid surfaces providing a current discharge path between said reaction surface and said grid.

4,021,598

ALKALINE DRY CELL

Tadayuki Naruishi, Tokyo; Youichi Kataoka; Haruyoshi Sasabe, both of Yokohama, and Satoru Tutiya, Tokyo, all of Japan, assignors to Toshiba Ray-O-Vac Co , Ltd., Tokyo, Japan

Filed June 16, 1976, Ser. No. 696,622
Claims priority, application Japan, June 18, 1975, 50-74146
Int. Cl.[2] H01M *6/04*
U.S. Cl. 429—206 4 Claims



1. An alkaline dry cell comprising:

an anode containing zinc as an active ingredient;

a cathode containing a silver oxide as an active ingredient;

an immobilized body of an alkaline electrolyte interposed between said anode and said cathode; and

a metallic silver layer formed at least on the surface of the anode side of said cathode by reduction of the silver oxide through a photochemical reaction.

4,021,599

OLEFIN POLYMERIZATION PROCESS AND CATALYST

Rajindar K. Kochhar, Katy, and Robert J. Rowatt, Orange, both of Tex., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 601,592, Aug. 4, 1975, abandoned, which is a continuation of Ser. No. 269,219, July 5, 1972, abandoned. This application Jan. 9, 1976, Ser. No. 647,755
Int. Cl.[2] C08F *4/02, 10/02*
U.S. Cl. 526—124 16 Claims

1. A process for preparing an olefin polymerization catalyst which consists essentially of the sequential steps of:

1. Intimately contacting a finely divided, alcohol-insoluble, heptane-insoluble, transition metal halide-insoluble support material with a 1-4 carbon atom alkanol solution of a magnesium compound,
2. Vaporizing the alkanol from the suspension of Step (1) to deposit the magnesium compound on the surface of the finely divided support material,
3. Suspending the product of Step (2) and a transition metal

halide in a liquid hydrocarbon for a period of at least 2 minutes, and

4. Adding an organometallic compound of a metal of Groups II-a, II-b and III-a of the Periodic Table to the suspension of Step (3);

the finely divided support material employed in Step (1) having at least one dimension not exceeding 600 microns and being selected from the group consisting of organic thermoplastic polymers and organic thermoset polymers; the magnesium compound employed in Step (1) having the structure:

$$MgX_2 \cdot nH_2O$$

where X is Cl, F, Br, I, NO_3, OCH_3, $OCOCH_3$, or OCOH, and n is not greater than 6, the magnesium compound employed in Step (1) constituting 5–25 weight % of the combined weight of the finely divided support and the magnesium compound; the transition metal halide employed in Step (3) being selected from the group consisting of the liquid or hydrocarbon soluble halides of titanium and vanadium, the alkoxides of titanium and vanadium and mixed transition metal halide compounds having the structure:

$$MX_nY_m$$

where M is titanium, vanadium or vanadyl, where Y and X are Cl, Br, or OR, where $m + n$ = the valence of M, and R is an alkyl group containing up to 4 carbon atoms; the transition metal halide employed in Step (3) being employed in the amount of 10% to 50% of the weight of the supported magnesium compound employed in Step (3); and the organometallic compound employed in Step (4) being employed in an amount sufficient to provide a ratio of from 0.005 to 2 mols of transition metal halide per mol of organometallic compound.

4,021,600
SLURRY POLYMERIZATION PROCESS

Colin Anolick, and Robert Allen Covington, Jr., both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 241,234, April 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 873,354, Nov. 3, 1969, abandoned. This application June 9, 1975, Ser. No. 585,352

The portion of the term of this patent subsequent to Apr. 2, 1991, has been disclaimed.

Int. Cl.² C08F 2/14, 210/18

U.S. Cl. 528—484 **12 Claims**

1. In a process for the copolymerization in a polymerization vessel of ethylene with

1 an α-olefin having 3 to 18 carbon atoms or

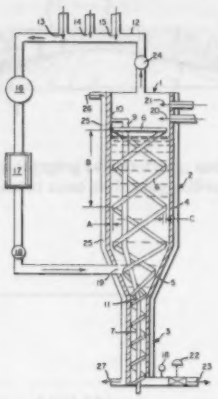
2 an α-olefin having 3 to 18 carbon atoms and a nonconjugated diene having only one readily polymerizable double bond

in the presence of a catalyst and of a liquid, organic polymerization medium to an elastomeric polymer insoluble in said polymerization medium, having a portion of said polymerization medium occluded therein, and tending to agglomerate on solid surfaces,

an improvement of simultaneously and continuously

a removing the agglomerated copolymer adhering to the interior surfaces of the polymerization vessel with an open-cage, double-flighted spiral ribbon and a rod placed inside the cage and positioned to remove the polymer from the inside periphery of said spiral ribbon; or with two intermeshed spiral helices, each, in addition to removing agglomerated polymer from the surfaces of the vessel, also removing polymer from each other;

b collecting the agglomerated copolymer as removed; and



c concurrently shearing and extruding the collected, agglomerated copolymer, whereby the occluded liquid polymerization medium is separated from the copolymer and remains in the polymerization vessel, while the copolymer is discharged from said vessel.

4,021,601
PAROMOMYCIN DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Federico Arcamone, Milan, and Giuseppe Cassinelli, Voghera, both of Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

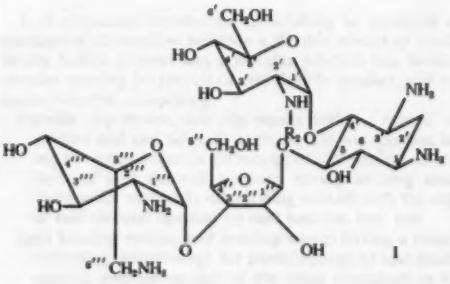
Filed Apr. 7, 1975, Ser. No. 565,657

Claims priority, application Italy, Apr. 11, 1974, 21250/74

Int. Cl.² C07H 15/22

U.S. Cl. 536—17 **5 Claims**

1. A 2′-N-alkylparomomycin or 2′N-phenylpropylparomomycin of formula (I):



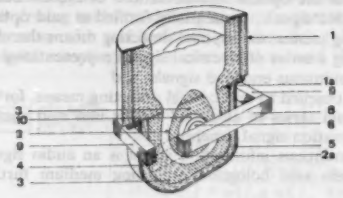
I

wherein R_2 is an alkyl radical having from 1 to 4 carbon atoms or a phenylpropyl radical.

4,021,602
CHANNEL FURNACE FOR MELTING METALS AND ALLOYS WITH A SINGLE INDUCTOR COIL ASSURING THE HEATING AND FORCED CIRCULATION OF THE MOLTEN METAL

Jean Delassus, Mornmorency, France, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Mar. 5, 1976, Ser. No. 664,305
Claims priority, application France, Mar. 7, 1975, 75.07193
Int. Cl.² H05B *5/14*
U.S. Cl. 13—29 **7 Claims**



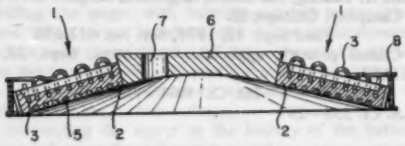
1. A channel furnace for the melting of metals and alloys, of the type having a melting tank, at least one heat-insulated duct which forms below the tank a loop situated in a vertical or oblique plane, and whose inner channels connects at least two different zones of the bottom of said tank, an inductor device for the heating and the unidirectional forced circulation of the molten metal in the channel, said inductor device consisting of a transformer with iron core passing across the loop of the channel, and two alternating current sources, one of which is a source of polyphase current, for feeding the inductor device, the improvement being that this inductor device comprises a single coil per looped duct, formed of two layers of conductors would along helices whose axial pitch is equal to the axial length of the coil for one half-turn of winding, the helical conductors in both layers forming two crossed families of conductors and being connected together to form a series wave winding, said coil being divided into n pairs (n 3) of circuits of m turns each, regularly distributed over the periphery of the coil, the two circuits of each pair being derived one from the other by a rotation of 180° about the axis of the coil and being connected together in series additively from the point of view of the axial component of the magnetic flux which they generate, and said pairs being shifted in angle by 2 π/n about the axis of the coil so as to form n phases shifted by 2 π/n and each having an input, an output, and a center tap, the n inputs being connected together at a at a second terminal, and in that the two current sources comprise a source of single-phase heating current, which is connected to the aforesaid two terminals, and a source of n-phase circulation current whose n phases are connected respectively at the n center taps of the n phases of the coil.

4,021,603
ROOF FOR ARC FURNACE

Toshio Nanjyo, and Masayuki Aoshika, both of Yokohama, Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1975, Ser. No. 624,766
Int. Cl.² F27D *1/12*
U.S. Cl. 13—35 **2 Claims**

1. A roof assembly for an arc furnace comprising a roof ring made of metal and defining the outer periphery of the furnace roof assembly, and a plurality of unitary, sectionalized roof units asssembled together in said roof ring to define the furnace roof, each unit comprising a trapezoidal-shaped, cast metallic member having spaced-apart inner and outer arcuate surfaces, a cooling coil embedded in said member for receiving and discharging a cooling liquid, and the units being arranged with their sides in abutting relationship and with the

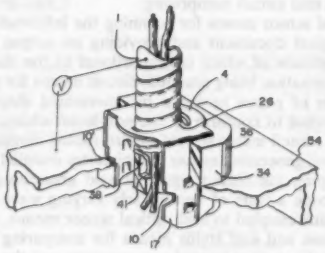


outer arcuate surfaces engaging said roof ring, said units being in the form of a truncated cone and being self-supporting.

4,021,604
FLEXIBLE CONDUIT CONNECTOR

Frank Peter Dola, Port Richey, and Frederick William Rossler, Jr., New Port Richey, both of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 14, 1975, Ser. No. 567,792
Int. Cl.² H02G *3/06, 3/08*
U.S. Cl. 174—51 **10 Claims**



1. A connector member for establishing an electrical and mechanical connection between a flexible electrical conduit having helical grooves and a metallic junction box having a circular opening for receipt of said flexible conduit, said connector member comprising:

metallic clip means, said clip means having a central web portion and two sidewall portions, said web portion having an opening therein for receipt of said flexible conduit, each of said sidewall portions having latching means thereon for resiliently establishing contact with the edges of said circular opening on said junction box, and

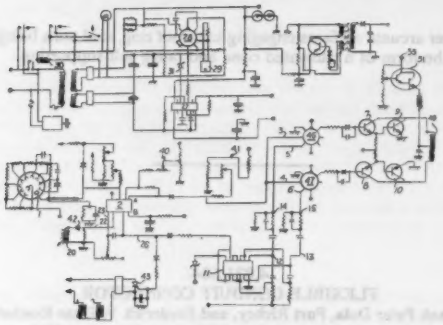
rigid housing means, said housing means having a passage extending therethrough for partial receipt of said flexible conduit and for receipt of the wires contained in said conduit, said housing means having two slots for receipt of said sidewall portions and a tubular extension which may be inserted into said circular opening, the axis of said tubular extension being aligned with said slots so that said latch means may be positioned on opposite sides of said tubular extension, whereby

said flexible conduit may be inserted into said opening and secured to said clip means and said tubular extension may in turn be inserted into said opening on said junction box and by the action of said latch means a secure mechanical connection is established and the electrical connection formed allows said junction box and said conduit to serve as a continuous ground.

4,021,605
ELECTRONIC CIRCUIT FOR ELECTRONIC STENCIL CUTTER

Julio G. Tauszig, San Isidro, Argentina, assignor to A. B. Dick Company, Chicago, Ill.

Filed Sept. 12, 1975, Ser. No. 612,638
Claims priority, application Argentina, Sept. 23, 1974, 255693
Int. Cl.² H04N 1/00
U.S. Cl. 358—297 10 Claims



1. Apparatus for electrically burning information from an original document into a stencil material having non-linear burning characteristics including a stylus for applying electrical pulses for burning said material and an electrical circuit coupled to said stylus for providing said electrical pulses thereto, said circuit comprising:

optical sensor means for scanning the information on said original document and providing an output signal, the amplitude of which is proportional to the shade of said information being scanned, circuit means for providing a train of pulses having a predetermined shape which is selected to conform to the non-linear characteristics of the stencil material, said circuit means comprising wave signal generating means and circuitry coupled thereto for shaping the output signal of said generating means to provide a train of non-linearly varying wave pulses and means coupled to said optical sensor means, said circuit means and said stylus means for comparing the output signal provided by said sensor means and the pulses provided by said circuit means, said comparing means providing output pulses having widths representing the intervals of time when the amplitude of the output signal of said optical sensor means is greater than the amplitude of the non-linearly varying wave pulses for application to said stylus for use in burning said stencil material, the width of said output pulses incresing non-linearly as the shade of the information scanned by said optical sensor means becomes darker.

4,021,606
HOLOGRAM APPARATUS

Yasutsugu Takeda, Tokorozawa; Yoshito Tsunoda, Mitaka; Fumio Imagawa, Hachioji; Keiji Kataoka, and Kimio Tatsuno, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 27, 1975, Ser. No. 562,394
Claims priority, application Japan, Mar. 27, 1974, 49-33556
Int. Cl.² G03H 1/30; H04N 5/86
U.S. Cl. 358—130 10 Claims

1. A hologram apparatus comprising:

a light source;

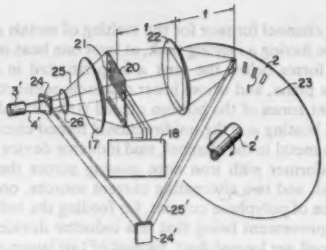
a hologram recording medium upon which are recorded a series of oblong-shaped holograms, each of which is the hologram of an optical representation of a respective one of a plurality of discontinuous encoded signals, each encoded signal corresponding to a portion of a continuous information signal periodically converted into a series of said discontinuous encoded signals, each discontinuous encoded signal being formed of a plurality of bits corresponding to the value of a respectively converted portion of said continuous information signal;

optical detecting means;

means for causing light from said light source to be sequentially directed upon said series of oblong-shaped holograms and to thereby form a series of reconstructed images of the optical representations of the discontinuous encoded signals, sequentially formed at said optical detecting means, said optical detecting means thereby producing a series of electrical signals representative of said discontinuous encoded signals; and

means, coupled to said optical detecting means, for decoding said series of electrical signals into said continuous information signal, wherein

said continuous information signal is an audio signal and wherein said hologram recording medium further includes a plurality of holograms of video information, with each of which holograms of video information plural ones of said series of oblong-shaped holograms are associated and are disposed adjacent to their associate holograms of video information,



said light directing means includes means for causing light from said light source to be directed upon a respective holograms of video information during the sequential direction of light upon its associated plural ones of said series of oblong-shaped holograms,

said detecting means includes means for detecting a reconstructed image of video information from the holograms of video information during production of said series of electrical signals representative of said discontinuous encoded signals, and

said decoding means includes means for reproducing said video information during the decoding of said series of electrical signals into said audio signal, and wherein

the long side of each oblong-shaped hologram is arranged orthogonal to the direction of sequential direction of light from said light directing means upon said series of oblong-shaped holograms.

4,021,607
VIDEO DISPLAY SYSTEM EMPLOYING DRIVE PULSE OF VARIABLE AMPLITUDE AND WIDTH

Yoshifumi Amano, Zushi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 13, 1974, Ser. No. 469,606
Claims priority, application Japan, May 19, 1973, 48-59020[U]
Int. Cl.² H04N 5/70; H05B 37/02
U.S. Cl. 358—230 8 Claims

1. A video display system comprising:

A. a display panel including a group of first parallel elec-

trodes and a group of second parallel electrodes substantially perpendicular to said first electrodes;

B. a group of first driving circuits connected to said first parallel electrodes respectively;

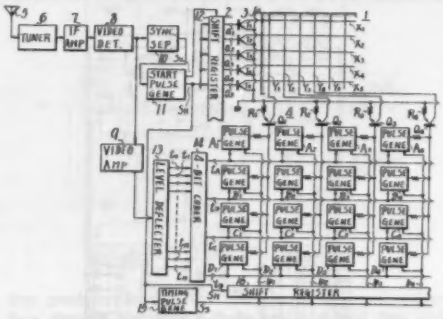
C. A group of second driving circuits connected to said second electrodes respectively;

D. A video signal source for supplying a video signal containing brightness information;

E. a sync. separator connected to said video signal source for separating horizontal and vertical synchronizing signals from said video signal;

F. means supplied with said horizontal synchronizing signals for driving said first driving circuits sequentially in synchronism with said horizontal synchronizing signals;

G. signal sampling means connected to said video signal



source for sampling said video signal and detecting the brightness level of the latter among a substantial number of brightness level steps therefor;

H. pulse generating means connected to said sampling means for sequentially generating driving pulses which are characteristic of the detected brightness levels of the sampled video signal and which are modulated both in amplitude and width in accordance with amplitude steps and width steps, respectively, which are each of substantially lesser number than said number of brightness level steps, such that the combination of amplitude and width of each driving pulse represents a detected brightness level; and

I. means for driving said second driving circuits in sequence in accordance with the driving pulses sequentially produced by said pulse generating means.

4,021,608

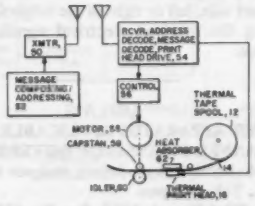
PRINT-ON-THE-FLY PAGER

Lester R. Brodeur, Nashua, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed May 22, 1975, Ser. No. 580,090

Int. Cl.² H04L *21/00, 15/34*

U.S. Cl. 178—30 **3 Claims**



1. A method for improving battery-operated performance and maintaining print legibility despite battery voltage decrease in a battery-operated, hand-held printing pager, in which the pager includes a tape and a print head driven in accordance with message signals decoded at the pager, and in which the pager is addressed by a predetermined paging code followed by message signals corresponding to alpha/numeric characters, comprising the steps of

providing the pager with battery-operated motor-driven tape drive means in which the motor is continuously driven upon the application of power thereto for advancing the tape continuously past the print head during the printing of the alpha/numeric characters at a speed dependent on the battery voltage,

and connecting the motor to the battery of the battery-operated pager through power switching means actuated to turn on the motor for the duration of the printing of the message in accordance with the decoding of a predetermined address at the pager, the legibility of the characters imprinted on the tape by the print head being virtually unaffected by variations in battery voltage and consequent variations in motor speed and the reliability of the printing operation being improved by the utilization of the continuously driven motor.

4,021,609

SYSTEM FOR REGENERATING A DATA FROM A BURST SIGNAL WHICH IS RECEIVED AND PROCESSING SAID DATA WITH A LOCAL CLOCK AND THE CIRCUIT FOR CARRYING OUT THE SAME

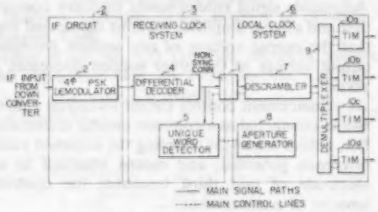
Mitsukazu Oyama; Yoshiro Tada, both of Kawasaki, and Yasuhiko Sakamoto, Fujisawa, all of Japan, assignors to Fujitsu Ltd., Japan

Filed Aug. 20, 1975, Ser. No. 606,065

Claims priority, application Japan, Aug. 30, 1974, 49-99599

Int. Cl.² H04L *7/00;* **H04B** *7/185*

U.S. Cl. 178—69.1 **5 Claims**



1. A data processing system in a receiving terminal of a PCM-TDMA system which receives a burst data signal, regenerates a burst clock from said burst data signal, and demodulates and processes said burst data signal to recover data and a unique word positioned before said data, recovery of said unique word being indicated by generation of a unique word detecting output synchronized with said burst clock, at least a part of said processing of said burst data signal being performed by means of a local clock haing a phase which is not synchronized with said burst clock, comprising:

a buffer register;

a first ring counter which is initially set by said unique word detecting output, said first ring counter being operated by said burst clock regenerated from said burst data signal to produce a first output;

a first group of gate circuits connected to said first ring counter and to said buffer register, and which writes said data in said buffer register, in order and in synchronizaion with said burst clock, by using the first output of said first ring counter;

a retiming circuit which receives and retimes, by said local clock, said unique word detecting output synchronized with said burst clock so as to synchronize said unique word detecting output with said local clock and to produce a locally synchronized output;

a second ring counter connected to said retiming circuit,

which second ring counter is initially set by the locally synchronized output of said retiming circuit, and which is operated by said local clock to provide a second output; and

a second group of gate circuits connected to said buffer register and to said second ring counter, and which reads the content of said buffer register in synchronization with said local clock by using the second output of said second ring counter.

4,021,610

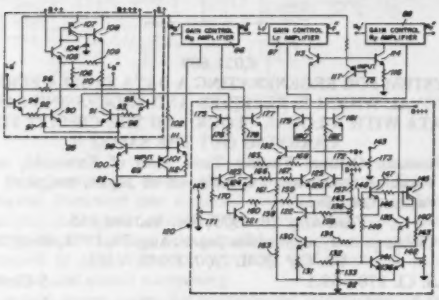
CONTROL CIRCUIT FOR A MATRIXED FOUR CHANNEL AUDIO REPRODUCING SYSTEM

Michael J. Gay, Geneva, Switzerland, assignor to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 503,833, Sept. 6, 1974. This application Mar. 24, 1975, Ser. No. 561,468

Int. Cl.² H03F *3/68*; H03G *3/10*

U.S. Cl. 179—1 VL **11 Claims**



1. Adjustable signal enhancement circuitry comprising:

a. first and second amplifier sections connected together so that the output voltage of one section increases as the output voltage of the other section decreases and vice versa;

b. an enhancement control circuit including a pair of transistors connected as a common emitter differential amplifier, a third transistor coupling the common emitters to a reference potential, and means attached to a control electrode of said third transistor for controlling the amount of enhancement;

c. said pair of transistors each having a control electrode adapted to receive an input signal for controlling the conduction of said pair of transistors in accordance with the enhancement desired; and

d. said first and second amplifier sections each being coupled to a different one of said pair of transistors in said enhancement control circuit for controlling the output voltage of said amplifier sections in accordance with the conduction of said pair of transistors.

7. A control circuit for adjusting the total magnitude of the gain control current flowing in all of a plurality of gain controlled amplifiers and the magnitude of the gain control currents in each of the gain controlled amplifiers relative to the magnitudes of the gain control currents in the other gain controlled amplifiers, the control circuit including:

a. differential amplifier means having one circuit path for conducting gain control current for all of the gain controlled amplifiers;

b. first control means coupled to said one circuit path for controlling the magnitude of said gain control current for all of the gain controlled amplifiers;

c. a plurality of separate circuit paths coupled through said differential amplifier means to said one circuit path, each of said plurality of separate circuit paths conducting gain control current for each of the gain controlled amplifiers; and

d. second control means coupled to said plurality of separate circuit paths for controlling the relative magnitudes of the gain control currents for the separate gain controlled amplifiers.

4,021,611

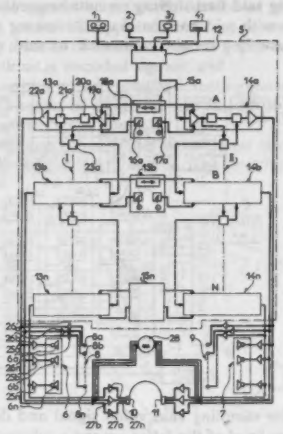
ELECTRONIC HEARING APPARATUS

Alfred Ange Auguste Tomatis, 68 Boulevard de Courcelles, 75008 Paris, France

Filed Apr. 23, 1976, Ser. No. 679,873

Int. Cl.² H04R *3/00*

U.S. Cl. 179—1 N **8 Claims**



1. Electronic hearing apparatus comprising at least one input device converting sound signals to electrical signals, operating means for these electrical signals comprising amplifiers and filters having selected response curves for effecting a modification of the characteristics of the electrical signals received at the input, and at least one output means for converting the electrical signals furnished by the operating means to sound signals to be applied to the hearing mechanism of a subject, said operating means comprising a plurality of stages in cascade each constituted by a pair of first and second operating circuits each including one said amplifier and respective filter having a selected response curve, and a common control circuit for controlling the opening of said first and second operating circuits to selectively determine quantitatively the passage of the signals through the two operating circuits; all of said first operating circuits constituting together a first channel having outputs, at least one output device including a respective transducer connected in parallel to the outputs of the first channel and associated with one side, right or left of the subject, all of said second operating circuits constituting together a second channel having outputs, at least one further output device including a respective transducer connected in parallel to the outputs of said second channel and associated with the other side, left or right of the subject, said transducers transforming the received electrical signals to vibratory or sound signals.

4,021,612

DECODER APPARATUS APPLICABLE TO MATRIX 4-CHANNEL SYSTEMS OF DIFFERENT TYPES

Susumu Takahashi, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Nov. 4, 1975, Ser. No. 628,831

Claims priority, application Japan, Nov. 7, 1974, 49-128324

Int. Cl.² H04R *5/00*

U.S. Cl. 179—1 GQ **3 Claims**

1. A decoder apparatus applicable to matrix 4-channel systems of different types and adapted to produce 4-channel

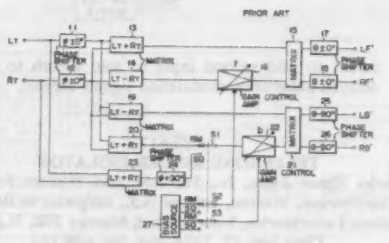
output signals by combining first and second composite signals to be decoded, said decoder apparatus comprising:

at least two gain control amplifiers each adapted to vary amplitude ratio between signals to be combined to produce output signal in accordance with the type of said first and second composite signals to be decoded; and

control circuit means for controlling the gains of said at least two gain control amplifiers in accordance with the type of said first and second composite signals to be decoded,

characterized in that said control circuit means comprises an FET array comprised of at least first, second, third and fourth field effect transistors formed in a semiconductor chip,

the source-drain paths of said first and second field effect transistors being coupled across a DC power source so



that predetermined direct currents of different values flow through the source-drain paths of said first and second field effect transistors, and

the source-drain paths of said third and fourth field effect transistors being AC coupled to said at least two gain control amplifiers, respectively, so that no direct current flows from said gain control amplifiers through the source-drain paths of said third and fourth field effect transistors and being adapted to control the gains of said at least two gain control amplifiers, respectively, depending on the resistances across the source-drain paths of said third and fourth field effect transistors; and

means for selectively coupling to each of said third and fourth field effect transistors either one of DC bias voltages which are produced by said first and second field effect transistors in accordance with the type of said first and second composite signals to be decoded.

4,021,613

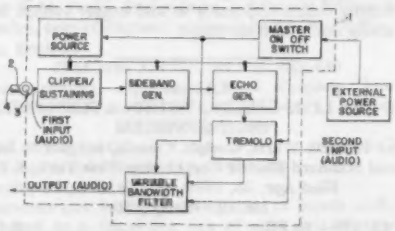
AUDIO INFORMATION MODIFYING APPARATUS

Clive Kennedy, 13 E. 63rd St., New York, N.Y. 10021

Filed June 9, 1975, Ser. No. 585,133

Int. Cl.² G10H *5/00*

U.S. Cl. 179—1 D **7 Claims**



1. An audio information modifier comprising first audio input terminals connected to a series circuit of first distortion means connecting to a second distortion means connected to a third distortion means connected to a fourth distortion means connected to a first input of a fifth distortion means, second audio input terminals connected to the second input terminals of said fifth distortion means, said fifth distortion means comprised of output terminals adapted to provide modified audio information voltages compatible with the input voltage levels required to drive a conventional linear audio amplifier without further distortion by said audio amplifier, said first, second, third and fourth distortion means each adapted with independent manual control elements operable to select desired magnitudes of voltage distortion affecting audio information introduced to said first audio input terminals, said fifth distortion means adapted with independent manual control elements operable to select desired magnitudes of voltage distortion affecting audio information present at said first and second input terminals of said fifth distortion means, said first distortion means comprised of amplitude clipping means and a positive voltage feedback path connected between the output and input of said amplitude clipping means, said second distortion means comprised of a local oscillator and a ring modulator circuit producing voltages which are sideband information in the form of sum and difference frequencies added to the signal distortion means, said third distortion means comprised of a memory storage echo device adapted to speedily retrieve signal information thus stored variably delayed in time and increasingly attenuated in amplitude with each cycle of retrieval, said fourth distortion means comprised of a negative feedback circuit connected from output to input of said fourth distortion means, having gradual cyclic variations in the amplitude of feedback, said fifth distortion means comprised of frequency selective attenuating circuitry suppressing the audio signals passing through said fifth distortion means utilizing high and low frequency attenuating filters.

4,021,614

WOOFER EQUALIZER

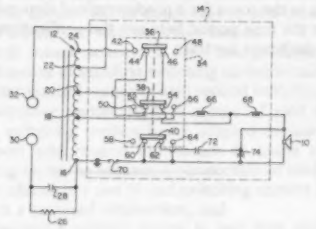
John J. Bubbers, Needham, Mass., assignor to Teledyne, Inc., Los Angeles, Calif.

Continuation of Ser. No. 537,319, Dec. 30, 1974, abandoned.

This application Sept. 16, 1976, Ser. No. 723,943

Int. Cl.² H04R *3/02*

U.S. Cl. 179—1 VL **11 Claims**



11. A method of changing the actual sound power output of a woofer over a selected range of frequencies so that said woofer provides a substantially uniform sound power output as perceived by the listener independent of the location of said woofer comprising the steps of:

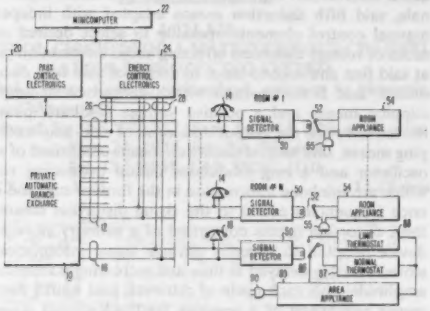
electrically coupling said woofer through a plurality of impedance channels of substantially fixed reactances to selected taps of a transformer secondary;

selectively directing the power input to said woofer along a selected one of said plurality of channels depending on the position of said woofer so that the actual sound power output available from said woofer, according to the selected one of said channels, differs over said frequency range by substantially fixed magnitudes compared to the actual sound power outputs respectively available from said woofer when the latter is energized by power along each of the others of said channels.

4,021,615
APPARATUS FOR CONSERVING ENERGY IN A BUILDING

Emrys Craig James, Palm Beach Gardens, and Gerald Henry Fairfax, North Palm Beach, both of Fla., assignors to RCA Corporation, New York, N.Y.

Filed July 30, 1975, Ser. No. 600,509
Int. Cl.² H04M *11/00*
U.S. Cl. 179—2 A 4 Claims



1. Apparatus for turning off power-consuming appliances in rooms of a building having a private automatic branch exchange telephone system, comprising

means at the exchange central periodically to apply a short burst of audio-frequency oscillations having a predetermined frequency and having a predetermined duration to telephone lines going to rooms in which power can be conserved,

detecting means in each room connected to the room telephone line to provide an output on receipt of a burst having said predetermined frequency and duration,

line relays in each room each having operating means and having contacts normally connecting power to the appliance in the room, and

time-out devices in each room each responsive to an output from the detecting means in the room to operate the line relay in the room, disconnecting power from the appliance in the room for a predetermined time period greater than the time period between the application of bursts at the exchange central.

4,021,616
INTERPOLATING RATE MULTIPLIER

William L. Betts, St. Petersburg, Fla., assignor to NCR Corporation, Dayton, Ohio

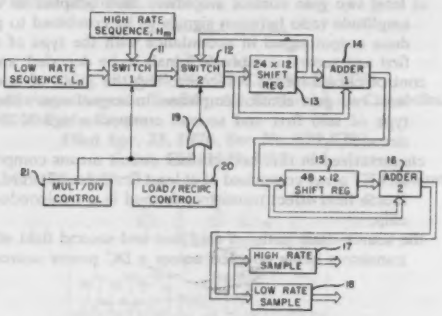
Filed Jan. 8, 1976, Ser. No. 647,534
Int. Cl.² H04L *25/16*
U.S. Cl. 179—15 BV 17 Claims

14. An interpolating rate multiplier for processing pulse code modulation signals comprising:

a switch having a first input for receiving said pulse code modulation signals and a second input for receiving recirculated pulse code modulation signals;

a digital filter comprising multi-stage shift register delay means coupled to said switch and an adder coupled to said switch and to the output of said shift register delay means; and

means coupling said output of said shift register delay

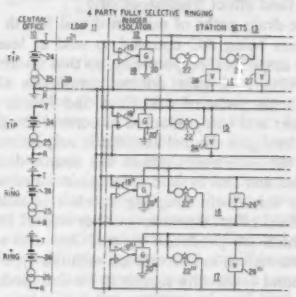


means to said second input of said switch to present delayed pulse code modulation signals thereat.

4,021,617
TELEPHONE RINGER ISOLATOR

Charles Elmer Jones, Jr., Fairfield, and William Frederick MacPherson, Warren, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 12, 1976, Ser. No. 648,165
Int. Cl.² H04M *13/00*
U.S. Cl. 179—17 E 10 Claims



1. A telephone ringer isolator circuit comprising:

a pair of terminals for receiving an alternating current signal superimposed on a direct current potential,

a detector connected between said pair of terminals for detecting said direct current potential,

a threshold circuit responsive to the polarity of said direct current potential for generating a trigger voltage, and

switching means responsive to said trigger voltage for enabling said telephone ringer.

4,021,618
INTRA LINK CALLING WITHIN A SUBSCRIBER DIGITAL SYSTEM

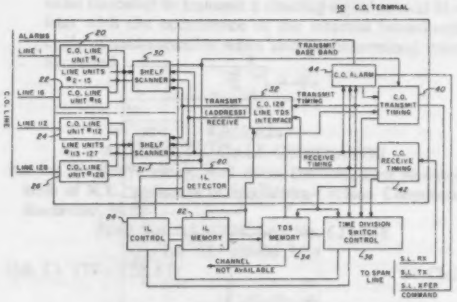
Walter Kenneth Wurst, Guelph, Canada, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,398
Int. Cl.² H04Q *3/60*
U.S. Cl. 179—18 FC 8 Claims

1. A telephone subscriber multiplexing concentrator system comprising: a central office, a plurality of remote terminals coupled to said office via a multiple-channel digital network, and a plurality of subscriber lines connected to each terminal; the channels of said network being divided into signalling channels, digital data channels and intra link channels, means

for signalling calls over said signalling channels, to enable digital data channels for the completion of a call from a calling line to a called line via remote terminals, and means employing said digital data channels for transferring a call between a called line at one of said remote terminals and a calling line at said one remote terminal from the enabled data channels to intra link channels for continuation of said call over said last mentioned intra link channels internally at said one remote terminal as an intra link call, and in which there are memories for storing line identification information at said one remote terminal for lines in an intra link call and memories at the central office accessed over said signalling channels for storing identifying data regarding lines for controlling the intra link call.

6. A telephone subscriber multiplexing network for coupling a plurality of subscriber lines to a central office by way



of a remote terminal coupled to said lines with the coupling from said remote terminal to said office being completed via a plurality of multiple channel unidirectional paths, said paths being a transmit path and a receive path, memory means at said central office for storing the calling and called condition of each of the lines using said channels, temporary storage means for storing the condition of a line using a channel for a transfer determination, means responsive to the storage of a predetermined condition of one of said lines in said temporary storage for initiating the transmission of digitized tones over a channel to a line coupled to said one line over said channels, means responsive to the failure of receipt of said tones by other ones of said lines using said channels for storing an indication of said failure for said one line in said memory means and for erasing the condition of said one line from said temporary memory.

4,021,619

IMPROVED DIGITAL TELEPHONE AND SWITCHING SYSTEM EMPLOYING TIME DIVISION MULTIPLEX PULSE CODE MODULATION

Arthur Robin Potter, Samundham, and Donald William Smith, Ipswich, both of England, assignors to The Post Office, London, England

Filed June 3, 1975, Ser. No. 583,430

Claims priority, application United Kingdom, June 10, 1974, 25564/74; June 10, 1974, 25565/74

Int. Cl.² H04Q *3/60*

U.S. Cl. 179—18 FC **8 Claims**

1. A digital switching system comprising:

a multiplicity of data terminals,

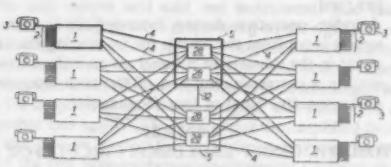
a concentrator having a multiplicity of inputs each connected to a respective one of said data terminals, a switching network connected from said inputs to a time division multiplex pulse code modulation (pcm) multiplexor, and control logic means connected to said switching network and said multiplexor,

a first pcm highway connected at one end to said multiplexor,

a first switching center including concentrator control means connected to the other end of said first pcm highway adapted to send to said control logic means of said concentrator a signal instructing the concentrator to connect one data terminal to a particular pcm channel on said first highway, and to connect another data terminal to another particular pcm channel on said first highway, switching means adapted to interconnect the particular pcm channels on said first highway to thereby interconnect the two data terminals, and switching center control means connected to said concentrator control means and said switching means,

a second pcm highway connected at one end to said multiplexor,

a second switching center including concentrator control means connected to the other end of said second pcm highway adapted to send to said control logic means of said concentrator a signal instructing the concentrator to connect one data terminal to a particular pcm channel on said second highway, and to connect another data terminal to another particular pcm channel on said second



highway, switching means adapted to interconnect the particular pcm channels on said second highway to thereby interconnect the two data terminals, and switching center control means connected to said concentrator control means and said switching means,

control link means connected from said switching center control means of said first switching center to said switching center control means of said second switching center, said switching center control means of said first and second switching centers being adapted to pass instructions over said control link means to cause the other switching center to attempt a connection of said particular pcm channels if one of said switching centers is unable to effect a required connection, and

said concentrator control means in said first and second switching centers including means to avoid the possibility of the same connection being set up on both said first and second pcm highways simultaneously.

4,021,620

MULTIFREQUENCY SIGNAL RECEIVER WITH DIGITAL TONE RECEIVER

Charlie Luther Jones, Jupiter, and William Lester Schulte, Jr., Lake Park, both of Fla., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,749

Int. Cl.² H04M *1/50*

U.S. Cl. 179—84 VF **1 Claim**

1. A dual-tone multifrequency receiver for translating the tones produced by a push button telephone to a 2-out-of-7 coded representation of the dialed number, comprising

an oscillator having a frequency much higher than the frequencies of said tones,

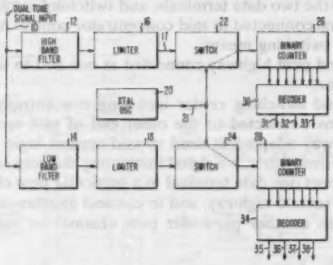
a high band circuit for high band tone frequencies, and a

low band circuit for low band tone frequencies, each circuit including:

a filter for passing the respective band of tone frequencies from an input terminal,

a limiter for translating a received tone sine wave passed by said filter to a corresponding square wave,

a counter,



a switch enabled by the output of said limiter for coupling the output of said oscillator to the input of said counter during alternate cycles of the square wave from the limiter, and

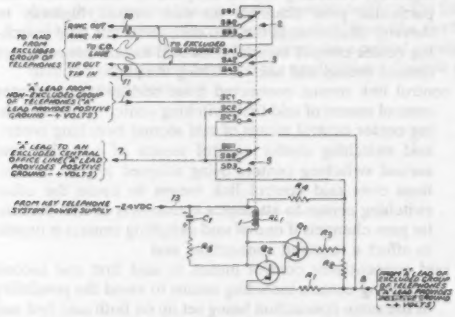
a decoder operative during intermediate cycles of the square wave from the limiter for translating the resulting count in the counter to a signal on an output line representing a corresponding one of the tone frequencies in said respective band of tone frequencies.

4,021,621

AUTOMATIC GROUP EXCLUSION CIRCUIT FOR A KEY TELEPHONE SYSTEM

Thomas Joseph Wycheck, Harrisburg, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed May 7, 1976, Ser. No. 684,340
Int. Cl.² H04M *1/68*
U.S. Cl. 179—99 **9 Claims**



1. An automatic group exclusion circuit connected to an excluded group of telephones, a non-excluded group of telephones and an excluded central office line, said exclusion circuit comprising:

a normally de-energized relay coupled to said excluded group of telephones, said non-excluded group of telephones and said excluded central office line; and

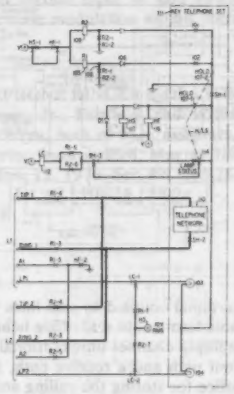
a normally non-conducting transistor circuit coupled to said relay and said excluded group of telephones, said transistor circuit being responsive to one of said telephones of said nonexcluded group of telephones going off-hook before one of said telephones of said excluded group of telephones goes off-hook to maintain said circuit non-conducting and to maintain said relay de-energized to prevent said one of said telephones of said excluded group of telephones from having access to said central office line and said transistor circuit being responsive to said one of said telephones of said excluded group of telephones going off-hook before said one of said telephones of said non-excluded group of telephones goes off-hook to render said transistor circuit conductive for actuating said relay to allow said one of said telephones of said excluded group of telephones to have access to said central office line.

4,021,622

NONLOCKING KEY TELEPHONE SET

John Francis O'Neill, Boulder, Colo., and Howard Robert Popper, Berkeley Heights, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 5, 1975, Ser. No. 637,883
Int. Cl.² H04M *1/72*
U.S. Cl. 179—99 **8 Claims**



5. In a key telephone system including a telephone set having a plurality of signaling lamps and a plurality of nonlocking keys for selectively connecting telephone lines to a terminating network said system further including

at least one set of relay contacts responsive to said nonlocking keys for connecting said telephone lines to said network,

a second set of relay contacts, for providing illumination power while in a first state of operation to said lamps for displaying full line status information when said telephone set is on-hook and for providing illumination power while in a second state of operation only to the one of said lamps corresponding to the line in use at said telephone set when said set is off-hook and,

means operative to restore said second set of relay contacts to the first state of operation when said set is off-hook for displaying full line status information.

4,021,623

AUTOMATIC H-REGISTER CLEAR FOR PREVENTION OF ERRONEOUS CONVOLUTION IN DIGITAL ADAPTIVE ECHO CANCELLER

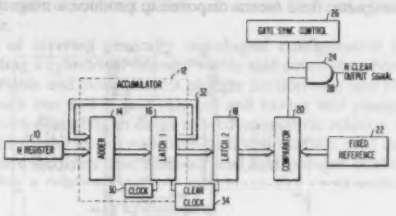
Henri G. Suyderhoud, Potomac; Michael Onufry, Jr., Brookeville, and Eric R. Kauffman, Walkersville, all of Md., assignors to Communications Satellite Corporation (Comsat), Washington, D.C.

Filed Oct. 23, 1975, Ser. No. 625,354
Int. Cl.² H04B *3/20*
U.S. Cl. 179—170.2 **8 Claims**

1. A circuit for generating an automatic H-register clear signal for adaptive echo cancellers comprising:

an accumulator receiving data from the H-register and determining the magnitude of words in the H-register;

comparator means receiving the output of said accumulator amd determining whether said output exceeds a fixed, predetermined value; and



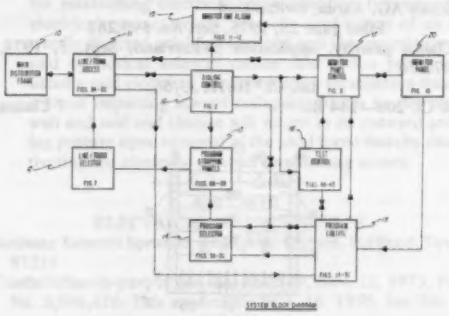
means synchronized with the housekeeping cycles of said echo canceller to transmit a clearing signal to said H-register with the occurrence of the internal housekeeping cycle of said canceller when said predetermined value is exceeded.

4,021,624

AUTOMATIC CALL GENERATOR

Patrick M. Kelly, Victor, and Alton Dorazio, East Rochester, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,058
Int. Cl.² H04M *3/24*
U.S. Cl. 179—175.2 D **17 Claims**



1. A call generator for testing a common control type telephone system having a plurality of call originating circuits and call terminating circuits, and a switch frame by way of which communication paths are established between said call originating and call terminating circuits under control of the common control, said call generator being selectively connectable with selected ones of the call originating and call terminating circuits and comprising

first means, coupled to a selected originating circuit port and a selected terminating circuit port, for generating first signals representative of a request for a connection between said originating circuit port and said terminating circuit port;

second means, coupled to said first means, for timing the operation of said first means and for generating a second signal representative of the inability of said common control to effect a communication path between said originating circuit port and said terminating circuit port within a prescribed period of time; and

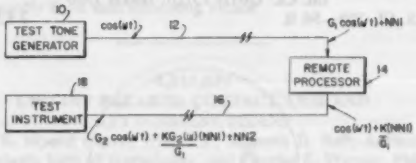
third means, coupled to said first means and said second means, for testing the proper operation of said first and second means, by testing the ability of said first means to generate said first signals and for testing the ability of said second means to time the operation of said first means.

4,021,625

INSTRUMENTS AND METHODS FOR MEASURING CHARACTERISTICS OF ONLY A SELECTED PORTION OF A TRANSMISSION CHANNEL

Frank R. Bradley, 9 Dash Place, Bronx, N.Y. 10463

Filed Feb. 25, 1976, Ser. No. 661,106
Int. Cl.² H04B *3/46*
U.S. Cl. 179—175.3 R **49 Claims**



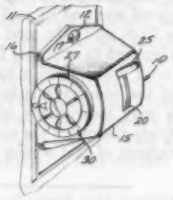
25. A test system for testing the characteristics of a communication channel of interest comprising a test tone generator connected to one of said channel; a remote processor having an input connected to the other end of said channel, and an output; a test instrument; and another channel connected between said output and said test instrument; said remote processor including means for operating on the signal received at said input, said received signal having tone and disturbance components therein, to derive a signal proportional thereto but with a tone level reduced relative to the disturbance level, means for amplifying said derived signal, and means for adding together and applying to said output the amplified derived signal and a tone having the same frequency and phase as those of the test tone contained in the signal received at said input.

4,021,626

MECHANICAL LIGHT SWITCH TIMER

Robert R. Becker, 1500 Grissom Park Drive, Fullerton, Calif. 92633

Filed July 25, 1975, Ser. No. 599,171
Int. Cl.² H01H *7/00*
U.S. Cl. 200—33 R **8 Claims**



1. Apparatus for automatically articulating an electrical switch comprising:

a housing adapted for mounting over said electrical switch;

a bistable lever pivotally mounted in said housing to project an exterior end therefrom for manual articulation between two stable positions;

a bracket disposed on the interior of said housing and pivotally secured to an interior projection on said lever and disposed to engage said electrical switch for articulating said switch concurrently with the articulation of said lever;

mechanical timing means mounted on said housing and adapted to extend a rotary shaft to the interior thereof;

actuating means disposed between said lever and said shaft for articulating said lever at selected positions of said shaft; and

mounting means formed on said housing for securing said

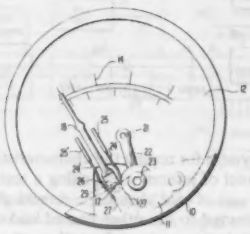
housing with said bracket in surrounding alignment over said switch.

4,021,627

SELF-CLEANING ELECTRICAL CONTACT FOR GAGES

James R. Francisco, Tulsa, Okla., assignor to Frank W. Murphy Manufacturer, Inc., Tulsa, Okla.

Filed Oct. 24, 1975, Ser. No. 625,388
Int. Cl.² G01D 13/26; H01H 1/00
U.S. Cl. 200—56 R 2 Claims



1. A wiping contact device suitable for attachment to the pointer support shaft and the movable pointer of gage, said gage having relatively stationary pin contact means mounted thereon, said device comprising a central flat mounting strip portion having an aperture to receive the pointer support shaft, a pair of spaced opposed substantially right angular flanges on said mounting strip portion integrally connected thereto and projecting away from one face thereof whereby said flanges may closely straddle an intervening part of the pointer, a pair of opposing spaced tabs integrally formed on the ends of said flanges adjacent to the mounting strip portion and being substantially at right angles to the flanges whereby the tabs may lap one end of the pointer to stabilize said device, a pair of generally parallel spaced opposed spring contact arms integrally attached to said flanges and extending therefrom in one direction longitudinally of the pointer to which the device is attached, said spring contact arms being unattached to said central mounting strip portion and being freely movable relative thereto, said spring contact arms extending substantially beyond one end of said mounting strip portion which is remote from said tabs, and a pair of flat plate-like wiping contacts secured to opposing free end portions of said spring contact arms and spaced a substantial distance from said aperture of the mounting strip portion, whereby said wiping contacts may individually and indepently wipingly engage the relatively stationary pin contact means disposed in the path of movement of said wiping contacts.

4,021,628

VACUUM FAULT CURRENT LIMITER

Clive W. Kimblin, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 20, 1975, Ser. No. 542,484
Int. Cl.² H01H 33/66
U.S. Cl. 200—144 B 9 Claims

1. A fast acting current limiting vacuum device which is operable to limit high voltage, high current line faults comprising:

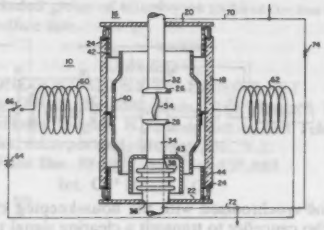
an insulated evacuated enclosure;

a pair of contacts disposed within said insulating evacuating enclosure, movable between a closed position completing an electric connection path through the enclosure and an open position wherein the contacts are spaced apart forming an arcing gap therebetween across which an arc is formed;

means for rapidly separating the pair of contacts to a spacing sufficient to permit an applied transverse magnetic field to produce an arc current zero and to prevent restriking of the arc across the separated contacts;

impedance means connected external to the enclosure in parallel across the contacts whereby the shunted fault current can be limited;

magnetic field means disposed to produce a magnetic field



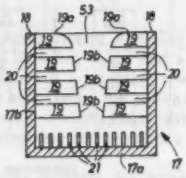
transverse to the arc formed between the separated contacts, which transverse magnetic field is generated after the contacts are separated a distance which permits the arc between the contacts to be rapidly extinguished, and which magnetic field rapidly increases the potential across the contacts to cause the fault current to be shunted to the parallel current limiting impedance path.

4,021,629

ARC ELECTRODE, ESPECIALLY FOR A CONTACT ARRANGEMENT IN A VACUUM SWITCH

Joachim Amsler, Seon, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed June 25, 1975, Ser. No. 590,282
Claims priority, application Switzerland, Sept. 5, 1974, 12074/74
Int. Cl.² H01H 33/66
U.S. Cl. 200—144 B 7 Claims



1. An arc electrode, especially for a contact arrangement of a vacuum switch, comprising an essentially hollow cylindrical contact piece having a longitudinal axis, and a plurality of electrode elements for taking-up arc base points, said electrode elements being fixedly connected with said essentially hollow cylindrical contact piece, extending into the interior of said contact piece along a radial direction, and being mutually spaced from one another along the longitudinal axis of said contact piece.

4,021,630

HERMETICALLY SEALED RESILIENT CONTACT SWITCH HAVING SURGICAL APPLICATIONS

Charles E. Taylor, Evergreen, Colo., assignor to Neomed Incorporated, Boulder, Colo.

Filed Apr. 25, 1975, Ser. No. 571,516
Int. Cl.² H01H 13/52, 9/04
U.S. Cl. 200—159 B 10 Claims

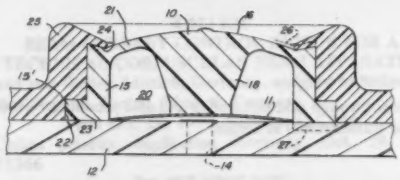
1. A resilient contact switch adapted for providing momentary electrical switching in electro-surgical instruments and the like comprising:

an insulator board having at least two electrical contact

points arranged in a common plane on one surface thereof,

a cover plate overlaying said insulator board having therethrough a bore with first and second open ends, said cover plate being positioned adjacent to said board so that said two contact points are at said first end of said bore,

a cap of inverted generally cup-shaped configuration including a cylindrical sidewall within said cover plate bore, a flexible end closure and a plunger portion with said end closure one end of said sidewall and having said plunger portion extending in inner spaced concentric relation to said cylindrical sidewall from said end closure, said end closure between said sidewall and said plunger portion having a relatively narrow membrane-like cross-section



which arches outwardly relative to the interior defined by said sidewall and further being positioned in the plane of said second end of said bore,

sealing means between said cover plate and said sidewall to sealingly position said sidewall on said insulator board in surrounding relation to said contact points and

means actuated by axial movement of said plunger portion for establishing electrical communication between said electrical contact points, whereby application of an inwardly directed axial force to said end closure relative to said cylindrical sidewall causes said piston portion to actuate said electrical communication establishing means without imparting inward collapsing forces to said sidewall and said end closure will return to its outward arching posture upon removal of the axial force thereby deactivating the electrical contact establishing means.

4,021,631

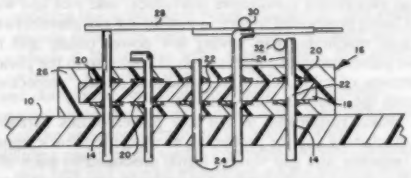
ELECTRICAL HEADER DEVICE

Anthony Edward Sprando, 3115 NW. Cornell, Portland, Oreg. 97210

Continuation-in-part of Ser. No. 414,919, Nov. 12, 1973, Pat. No. 3,906,416. This application Sept. 15, 1975, Ser. No. 613,341

Int. Cl.² H01H *1/00*

U.S. Cl. 200—238 **3 Claims**



1. An electrical header device for electrical connection with electrical components or switching means comprising:

a dielectric member of planar configuration having conductive means secured on at least one surface of said dielectric member at spaced intervals;

electrical pin means extending through each of said conductive means and said dielectric member and being connected to said conductive means by high temperature solder means thereby securing said electrical pin means in position in said dielectric member with excellent mechanical strength and heat resistant capability to maintain said electrical pin means in position, each of said electrical pin means having a section extending outwardly from one surface of said dielectric member for electrical connection to electrical components or switching means and another section extending outwardly from another surface of said dielectric member for connection with conductor means on a printed circuit board means; and

insulating means encapsulating said dielectric member with said sections of said electrical pin means extending outwardly from said insulating means.

4,021,632

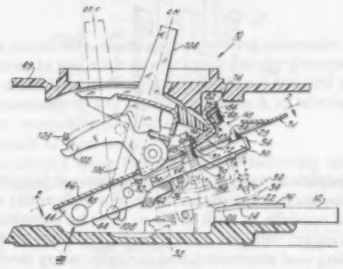
CIRCUIT BREAKER CONTACT ARM AND ATTACHMENT MEANS

Felix E. Myers, Cherry Hill, N.J.; Kenneth D. Ball; Anthony Michetti, both of Warminster, and Charles E. Warner, Philadelphia, all of Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Filed Jan. 23, 1976, Ser. No. 651,795

Int. Cl.² H01H *1/50*

U.S. Cl. 200—250 **16 Claims**



1. In a circuit breaker, comprising: a casing, a stationary contact, a movable contact movable into and out of engagement with said stationary contact, said contacts being within said casing;

an electrically conductive contact arm; said contact arm including an underside having a surface; said contact arm including a top side having a respective surface and being on the opposite side of said contact arm from said underside; a conductive connection connected to said contact arm and leading away therefrom; said contact arm having a direction of extension between one end and an opposite end thereof; said movable contact being attached to said contact arm one end and on said contact arm underside surface;

a contact carrier toward which said contact arm opposite end extends;

a contact carrier pivot mount for joining said contact carrier to said casing in a manner to permit said contact carrier to be pivoted to bring said movable and said stationary contacts into engagement and apart;

a pivot pin supported by said contact carrier and extending across said contact carrier in a direction transverse to said direction of extension of said contact arm and spaced from said contact carrier pivot mount, whereby said pivot pin is pivotable around said contact carrier pivot mount by pivoting of said contact carrier;

first means at said contact arm opposite end and on said contact arm for being engaged by said pivot pin in a manner such that said contact arm is pivotable around said pivot pin;

second means on said contact carrier for holding said contact arm to said contact carrier and on said pivot pin;

biasing means in engagement with and extending between said contact arm and said contact carrier such that said

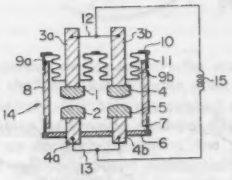
biasing means applies force to said contact arm for biasing it with said movable contact to pivot around said pivot pin toward said stationary contact; restraining means for restraining and defining the extent to which said contact arm may so pivot with respect to said contact carrier toward said stationary contact.

4,021,633

PERSISTENT CURRENT SWITCH INCLUDING ELECTRODES FORMING PARALLEL CONDUCTIVE AND SUPERCONDUCTIVE PATHS

Kooji Kuwabara; Hiroyuki Sugawara, both of Hitachi, and Takao Miyashita, Mito, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 12, 1975, Ser. No. 576,372
Claims priority, application Japan, May 15, 1974, 49-53321
Int. Cl.² H01H *1/02*
U.S. Cl. 200—262 **8 Claims**



1. A persistent current switch comprising at least one pair of highly conductive electrodes made of a high-purity metal and disposed opposite to each other so as to be movable into and out of contact with one another, electrode holder means for supporting said electrodes, and air-tight casing means evacuated to a high vaccum for enclosing said electrodes and supporting said electrode holder means with said electrodes in insulated relationship with each other in their separated condition, wherein the improvement comprises the fact that each of said electrodes is provided with a highly conductive contact portion of a high-purity metal having a very small resistivity at extremely low temperatures and with a superconducting contact portion of a superconducting material so that parallel current paths formed by said highly conductive contact portions and said superconducting contact portions on the respective electrodes may be simultaneously established when said electrodes are brought into contact with each other.

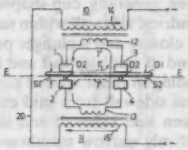
4,021,634

MESH WELDING MACHINE

Hans Gött; Josef Ritter; Klaus Ritter; Gerhard Ritter; Gottfreid Zechner, and Gerhard Schmidt, all of Graz, Styria, Austria, assignors to Firma Evg Entwicklungs-u Verwertungsgesellschaft, Graz, Austria

Filed Mar. 18, 1976, Ser. No. 668,216
Claims priority, application Australia, Apr. 2, 1975, 2505/75
Int. Cl.² B23K *11/00*
U.S. Cl. 219—56 **5 Claims**

1. A mesh welding machine for electrically resistance welding together at their points of intersection in a mesh production plane, two crossed groups of parallel wires, the machine comprising at least two pairs of opposed cooperating welding electrodes, one of said pairs being arranged on each side of said mesh production plane, and a pair of transformers, said transformers having their primary widings connected in series, and each of said pairs of electrodes being connected to the secondary winding of one of said transformers, said connection being arranged such that in operation the welding current



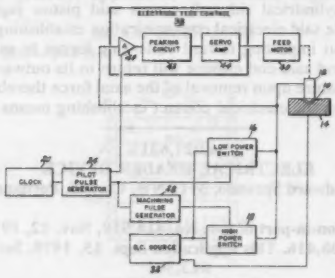
will flow through said electrodes and said secondary windings of said transformers in series.

4,021,635

APPARATUS FOR CONTROLLING TOOL FEED MECHANISM ON AN EDM MACHINE

Jerry Earl Losey, Fort Thomas, Ky.; John Richard Witzel, Milford, and Harry Dean Kauffman, Cincinnati, both of Ohio, assignors to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Dec. 29, 1975, Ser. No. 645,256
Int. Cl.² B23P *1/08*
U.S. Cl. 219—69 G **6 Claims**



1. An apparatus for controlling a feed mechanism to generate relative motion between an electrically conductive tool and an electrically conductive workpiece, said tool and workpiece being positioned to form a machining gap therebetween, and said machining gap having low power pulses and high power pulses produced thereacross in response to the periodic occurence of pilot pulses and machine pulses, respectively, wherein the improvement comprises:

a. means responsive to the low power pulses across the machining gap for producing a voltage feedback signal in response to a gap voltage signal produced by each of the low power pulses having a magnitude equal to or exceeding a predetermined voltage magnitude;

b. means responsive to the high power pulses across the machining gap for producing a current feedback signal in response to a gap current signal produced by each of the high power pulses having a magnitude equal to or exceeding a predetermined current magnitude;

c. means for generating timing signals synchronized with the occurence of the pilot pulses and the machining pulses;

d. means responsive to the voltage feedback signal and the timing signals for detecting the occurence of the voltage feedback signal during the occurence of a corresponding

pilot pulse and storing a voltage signal as a function thereof;

e. means responsive to the current feedback signal and the timing signals for detecting the occurrence of the current feedback signal during the occurrence of a corresponding machining pulse and storing a current signal as a function thereof;

f. means responsive to the voltage signal and the current signal for producing control signals representing conditions in the machining gap as a function of the presence and absence of said current and voltage signals; and

g. means having inputs responsive to the control signals and outputs connected to the feed mechanism for controlling the feed mechanism as a function of the control signals.

4,021,636

BEAM CURRENT CONTROL DEVICE FOR A TECHNICAL CORPUSCULAR BEAM APPARATUS

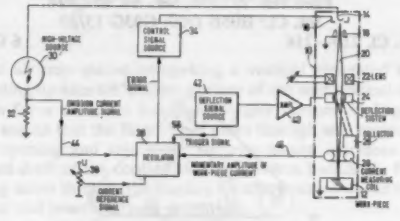
Alfred von Walter, Munich, Germany, assignor to Steigerwald Strahltechnik GmbH, Munich, Germany

Filed Oct. 28, 1975, Ser. No. 626,224

Claims priority, application Germany, Oct. 29, 1974, 2451366

Int. Cl.² B23K 9/00

U.S. Cl. 219—121 EB **4 Claims**



1. A device for controlling the beam current in charged corpuscular beam apparatus for working on work pieces, comprising

a beam gun having deflection means and a source which emits charge-carriers, to result in a charge carrier current;

means for switching on and interrupting the beam striking the work piece;

first measuring means for determining the work piece current as a measure of the current intensity of the corpuscular beam striking the work piece;

control means for controlling the magnitude of the current of the corpuscular beam emitted by said gun;

said switching-on and interruption of the corpuscular beam striking the work piece being effected by said deflection means deflecting said beam from a working position in which it strikes the work piece into a rest position in which it strikes a collector device,

and comprising, in accordance with the invention,

second measuring means for the continuous determination of the emission current of the carrier-source;

dividing and storage means connected to and controlled by said first and second measuring means for producing and storing of a quotient signal from the values of the emission current and the work-piece current during switching-on of the latter;

multiplier means for the continuous formation of a product signal from the stored quotient signal and the continuously produced emission current actual value signal;

means providing a reference signal to control the charge carrier current;

means for comparing the product signal with a reference signal and providing an error signal;

and means conveying said error signal to said control means causing it to operate in the sense of a reduction in the error signal.

4,021,637

FLUX-CORED WIRES FOR ELECTROGAS WELDING

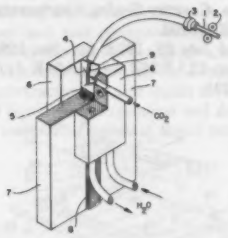
Robert J. DeHaeck, St. Pieters-Kapelle, Belgium, assignor to La Soudure Electrique Autogene, Procedes Arcos, Anderlecht, Belgium

Filed Aug. 29, 1975, Ser. No. 609,042

Claims priority, application Belgium, Sept. 6, 1974, 148259

Int. Cl.² H05B 7/07

U.S. Cl. 219—146 **5 Claims**



1. Flux-cored wire-electrode for vertical automatic welding, from bottom to top, with an electric arc under gaseous protection, the wires having diameters from 1 to 4 mm and generally shaped internally in any configuration such as tubular, heart-shaped or composite, characterized by:

a. a sheath of steel strip;

b. a powdered filing flux having the following qualitative and quantitative composition (in powder weight):

(1)	Iron powder	3%
(2)	Silicofluoride of potassium (K_2SiF_6)	4%
(3)	Cryolite (Na_3AlF_6)	2%
(4)	Nickel powder	3%
(5)	Ferro-molybdenum (at 65 up to 75%)	0.8%
(6)	Refined ferromanganese (85 up to 90%)	9.9%
(7)	Ferrosilicon (45%)	1%
(8)	Ferrotitanium (30%)	0.5%
(9)	Micaceous iron oxide	1%
(10)	Fine silica	4%
(11)	Silicocalcium	0.8%

4,021,638

METHOD AND APPARATUS FOR THE DESTRUCTION OF AN UPPER PORTION OF A STRUCTURE

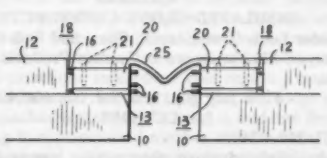
Kensuke Asakura, 1-29-16, Kinuta, Setagaya, Tokyo, Japan

Filed Sept. 18, 1975, Ser. No. 614,558

Claims priority, application Japan, Sept. 25, 1974, 49-109514

Int. Cl.² H05B 1/00

U.S. Cl. 219—200 **10 Claims**



1. In a structure having a lower portion made of concrete

and an upper portion made of concrete and disposed on said lower portion, said structure comprising:

at least one heat destructive layer embedded between the lower portion and said upper portion at the time of the construction of said upper portion; and

said heat destructive layer includes at least one heating device and at least one heat destructive part, said heat destructive part being destroyable by supplying electric power to said heating device.

4,021,639

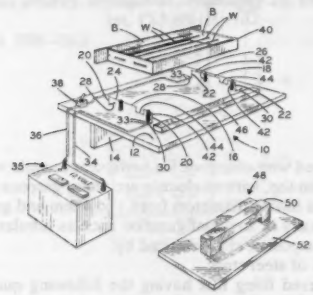
DEVICE FOR USE IN INSTALLING WAX FOUNDATIONS IN BEE FRAMES

Jesse M. Espino, Country Squire Apartments, P.O. Box 338, Armona, Calif. 93202

Filed July 28, 1975, Ser. No. 599,864

Int. Cl.² H05B *1/00;* **A01K** *51/00*

U.S. Cl. 219—201 **5 Claims**



1. A device for use in installing wax foundation sheets in bee frames of the type formed of substantially dielectric material and having a plurality of foundation wires extended in substantial parallelism between a pair of opposite sides of the frames, comprising:

A. a table including a substantially horizontally planar surface for receiving in supported relation a bee frame characterized by at least one foundation wire extended between the sides of the frame;

B. means for applying a voltage across the foundation wire of a bee frame supported on said surface including a pair of elongated, resiliently supported electrical contacts mounted on said table in spaced parallelism, each contact of said pair being of a substantially inverted U-shaped configuration having a pair of laterally spaced end portions rigidly affixed to the planar surface of the table and projected substantially vertically therefrom, and a resilient mid-portion integrally related to said end portions and extended in spaced relation with said planar surface; and

C. means for urging the contacts into engagement with the foundation wire, including a compression spring mounted on said planar surface between the end portions of each of the contacts and disposed in supporting relation with the midportions thereof.

4,021,640

INSULATED GLOVE CONSTRUCTION

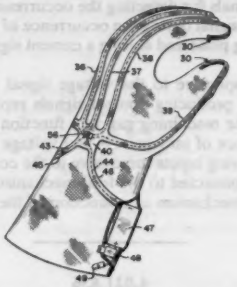
Alexander Louis Gross, Aspen, Colo., and Erik O. Giese, Key Biscayne, Fla., assignors to Comfort Products, Inc., Aspen, Colo.

Filed July 30, 1975, Ser. No. 600,422

Int. Cl.² H05B *1/00*

U.S. Cl. 219—211 **8 Claims**

1. An insulated glove construction comprising an outer covering, an inner liner material extending over the finger portions and the thumb portion of said glove construction, and a separate strip of mesh material between the inner lining material and outer covering extending over the back, front



and end of each of the finger portions and of the thumb portion.

4,021,641

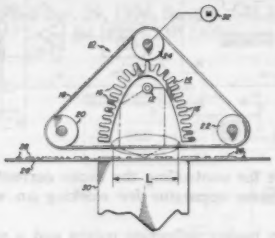
RADIANT FUSER FOR FIXING TONER IMAGES

John F. Elter, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 2, 1976, Ser. No. 654,494

Int. Cl.² H05B *1/00;* **G03G** *15/20*

U.S. Cl. 219—216 **6 Claims**



1. Radiant fuser apparatus for fixing toner images to substrate material, said apparatus comprising:

a source of radiant energy; and

means including a reflector and lens structure for focusing said radiant energy on said toner images, said lens structure being in the form of a belt which forms a conduit through which air can be moved for cooling of said lens structure said reflector and said source of radiant energy being disposed with said conduit with said source of radiant energy being disposed intermediate a portion of said lens and said reflector.

4,021,642

OVEN EXHAUST SYSTEM FOR RANGE WITH SOLID COOKTOP

George Fields, Jr., Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

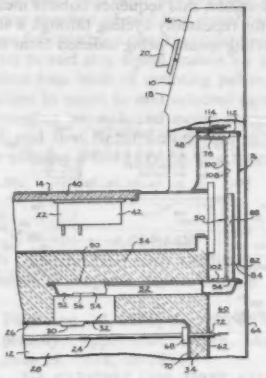
Filed Feb. 28, 1975, Ser. No. 554,198

Int. Cl.² H05B *1/00;* **F24C** *15/32;* **F23J** *11/00*

U.S. Cl. 219—391 **6 Claims**

1. A baking oven comprising an outer cabinet and internal walls forming an oven cooking cavity, heating means for raising the temperature within the cooking cavity, said cooking cavity including an oven vent means with a restricted vent opening the outer cabinet including a vertical duct means joined to the oven vent means and extending upwardly to an exhaust opening in the top portion of the outer cabinet for returning the oven gases to the atmosphere, the said vertical

duct means having a cooling air entry means adjacent its bottom portion for mixing relatively dry cool air with the oven gases before the oven gases are expelled from the exhaust opening, the vertical duct means also including an elongated telescopic air trap means adjacent its bottom portion communicating with said vent opening, the cross-sectional area of said telescopic air trap means being approximately equal to that of said restricted vent opening, the said elongated telescopic air trap means comprising a vertical elongated tube extending up into the bottom portion of the said vertical duct means for a sufficient height above the bottom cooling air entry means that the flow of hot gases through said restricted vent opening and telescopic air trap means increases the upward draft of the cooling air and prevents backdrafts from exiting down through the cooling air entry means under both normal and oven overload conditions.



4,021,643

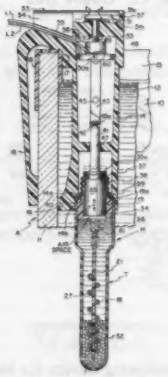
IMMERSION HEATER FOR AQUARIUMS

Frank Kenneth Hall, and Ronald D. Moore, both of Saginaw, Mich., assignors to O'Dell Manufacturing, Inc., Saginaw, Mich.

Continuation-in-part of Ser. No. 433,291, Jan. 14, 1974, Pat. No. 3,895,217. This application June 13, 1974, Ser. No. 479,252

Int. Cl.² H05B *3/80, 1/02;* **H01H** *37/44;* **A01K** *64/02*

U.S. Cl. 219—523 **23 Claims**



1. In a safety heating device for upright immersion in liquid filled aquariums: a housing including an axially extending heat transmitting tube with imperforate side walls and in imperforate end wall forming a chamber sealed except at its upper end and having linearly heat expansible, heat conducting liquid therein; an electrical circuit; an electrically operated heater connected in said circuit and extending axially in said tube and being substantially immersed in said liquid; an actuator assembly closing the top of said tube and having an axially and linearly movable plunger operatively associated with said liquid to be reactive to thermal expansion of the liquid while the liquid is in a liquid state for axial movement relative to said tube; a switch connected in said circuit with said heater comprising first and second electrical contacts; means supporting said plunger so as to be spaced from the surface of the liquid by an air space having a volume less than about ten percent of the liquid volume and said plunger being responsive to the thermal expansion of the liquid via said air space as a damping medium to activate and deactivate the switch contacts with expansion and contraction of said liquid to control the temperature of said liquid via energization and deenergization of said heater and maintain a constant liquid temperature.

4,021,644

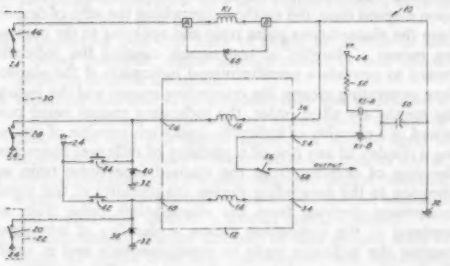
CIRCUIT FOR MONITORING THE SEQUENCE OF EVENTS AT A CASHIER CHECKOUT CENTER

Daniel M. Dreslinski, Livonia, Mich., assignor to Automatic Parking Devices, Inc., Farmington, Mich.

Filed Oct. 16, 1975, Ser. No. 622,878

Int. Cl.² H03K *21/00*

U.S. Cl. 235—92 TC **11 Claims**



1. In a circuit for monitoring the sequence of events at a cashier checkout center and which includes a register for entering customer transactions and means detecting the presence of a customer at said center, the improvement comprising a bidirectional counter operatively connected to said register and said detecting means to count in one direction as customers arrive at said center and in the other direction as transactions are entered on said register such that said counter provides a count of the difference between the number of customers which have been present at said center and the number of transactions entered on said register, means responsive to said counter for indicating that the count in said counter has reached a preselected count in said one direction corresponding to a preselected number of customers having been present at said center without corresponding register transactions having been entered, and means responsive to said indicating means for providing a cashier violation signal.

4,021,645

METHOD AND APPARATUS FOR DETERMINING WHETHER AN ELECTRONIC TAXIMETER IS IN PROPER WORKING ORDER

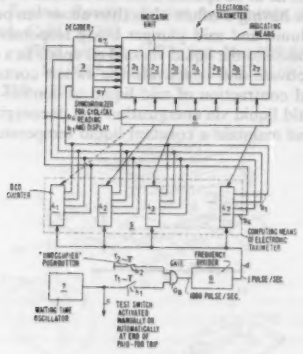
Manfred Säufferer, Villingen-Schwenningen; Siegfried Spauszus, Unterkirch, and Ulrich Warkentin, Tannheim, all of Germany, assignors to Kienzle Apparate GmbH, Villingen, Germany

Filed July 11, 1975, Ser. No. 594,462

Claims priority, application Germany, July 13, 1974, 2433753

Int. Cl.² H03K 21/30; G07B 13/00

U.S. Cl. 235—92 TC 8 Claims



1. A method of determining whether an electronic taximeter is in order, the taximeter being of the type comprises of indicating means for displaying any of a preselected plurality of characters relating to taxi fare, computing means operative for receiving fare-determining signals and in dependence thereon computing the characters to be displayed by the indicating means, means for generating the fare-determining signals including elapsed-time pulse generating means for generating an elapsed-time pulse train of fixed pulse repetition frequency determinative of a component of fare dependent upon elapsed time, the method comprising the step of deriving from the elapsed-time pulse train and applying to the computing means a plurality of test signals causing the indicating means to provide a predetermined indication if the elapsed-time generating means, the computing means and the indicating means are all in order, the indicating means being comprised of a plurality of indicator units each capable of producing a display of any one of a plurality of different characters, the step of deriving from the elapsed-time pulse train and applying to the computing means the plurality of test signals comprising deriving from the elapsed-time pulse train and applying to the computing means a plurality of test signals causing the indicator units to simultaneously and in unison display the same predetermined sequence of characters.

4,021,646

UP/DOWN COUNTER WITH A TRACKING 5/6 INPUT CIRCUIT

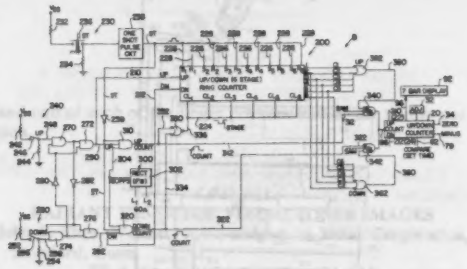
Carl H. Meier, Davenport, Iowa, assignor to Gulf & Western Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 478,979, June 13, 1974, Pat. No. 3,930,142. This application Oct. 1, 1975, Ser. No. 618,489

Int. Cl.² H03K 21/06; G06M 3/14

U.S. Cl. 235—92 PL 1 Claim

1. In a digital system for totalizing time including a digital counter having a first input means for counting up upon receipt of a counting pulse and a second input means for counting down upon receipt of a counting pulse; an up count control means for creating a train of up counting pulses having a constant time base frequency of 120 pps; a down count control means for creating a train of down counting pulses having said time base frequency; first pulse passage means for passing five out of six of said up counting pulses to said first input means of said digital counter and for inhibiting one out of six pulses; second pulse passage means for passing five out of six of said down counting pulses to said second input means of said digital counter and for inhibiting one out of six pulses; and, means for preventing concurrent up and down counting of said digital counter; the improvement comprising: sequence control means for causing said first and second passage means to inhibit said one out of six pulses at identical progressively totalized count positions, said sequence control means including cycle means for repeatedly cycling through a series of six numbers, said cycling means being indexed from number-to-



number by each of said counting pulses, means for causing said numerical cycling to be in a first numerical direction upon creating of each of said up counting pulses, means for causing said cycling to be in a second numerical direction opposite to said first numerical direction upon creating of each of said down counting pulses, means for inhibiting the up counting pulse immediately after a selected cycled number has been reached in said first numerical direction and means for inhibiting the down counting pulses immediately before said selected cycle number has been reached in said second numerical direction; and, means for converting sixty cycle per second line current to said train of up counting pulses and means for converting sixty cycle per second line current to said train of down pulses.

4,021,647

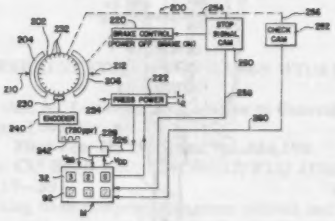
ELECTRONIC MONITORING DEVICE FOR POWER PRESS BRAKES AND SIMILAR DEVICES

Carl H. Meier, Davenport, Iowa, assignor to Gulf & Western Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 478,979, June 13, 1974, Pat. No. 3,930,142. This application Oct. 17, 1975, Ser. No. 623,439

Int. Cl.² G06M 3/02

U.S. Cl. 235—92 TF 30 Claims



1. An electronic monitoring device for indicating when the stopping time of a brake adapted to stop the motion of a mechanical drive system upon receipt of a stop signal exceeds a preselected time, said drive system having a shaft rotating at

a velocity corresponding to said motion of said drive system, means for creating a stop signal and means for applying said brake in response to said stop signal, said monitoring device comprising: a digital counter having an input for counting pulses; means for starting a counting interval of said counter in response to said stop signal; means for terminating said counting interval when said shaft is stopped; means for applying counting pulses to said counter input; means for creating a first signal when said digital counter has counted to a selected number indicative of proper brake action; means creating a second signal when said shaft has stopped; indicating means actuated upon creation of said first signal before said second signal; means for creating a checking counting interval for said counter prior to said stop signal, means for creating a generally fixed time base train of counting pulses, said frequency being sufficient to count to said selected number during said checking counting interval, and means responsive to lack of creation of said first signal during said checking counting interval for creating a drive system shut down signal.

4,021,648

FUNCTION GENERATOR AND APPLICATION THEREOF

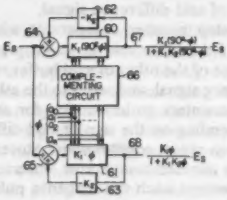
Kunihiro Sakata, Kanagawa, Japan, assignor to Hitachi, Ltd., Japan

Filed Aug. 22, 1975, Ser. No. 607,036

Claims priority, application Japan, Aug. 28, 1974, 49-97957; June 21, 1974, 49-70219

Int. Cl.² G06J *1/00;* H03K *13/02*

U.S. Cl. 235—150.53 **7 Claims**



2. A function generator comprising:

a first function generator supplied with an angular signal ϕ at an input thereof and producing at outputs thereof functions

$$f_1(\phi) = \frac{K'(90^\circ - \phi)}{1 + K(90^\circ - \phi)} \text{ and } f_2(\phi) = \frac{K'\phi}{1 + K\phi}$$

in which K and K' are given constants and in which the ratio $f_2(\phi)/f_1(\phi)$ approximates tan ϕ; and

a second function generator connected in series with said first function generator and producing one of the functions

$$1 + \frac{B\phi}{1 + A\phi} \text{ and } 1 + \frac{B(90^\circ - \phi)}{1 + A(90^\circ - \phi)}$$

in which A and B are given constants, said function produced by said second function generator approximating the function

$$\frac{1}{\sqrt{f_1^2(\phi) + f_2^2(\phi)}},$$

thereby generating at the outputs of said function generator functions approximating to cos ϕ and sin ϕ or a circular function of a substantially constant vector lenght.

4,021,649

DATA COMPOSITING AND ARRAY CONTROL SYSTEM

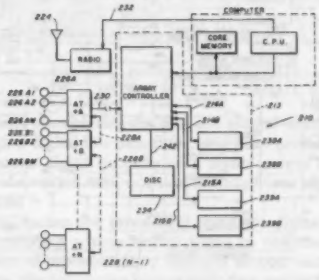
J. Robert Fort; James A. Westphal, both of Altadena, and Donald R. Juilfs, Chatsworth, all of Calif., assignors to Geophysical Systems Corporation, Pasadena, Calif.

Continuation-in-part of Ser. No. 566,045, April 7, 1975, Pat. No. 3,986,008, which is a continuation of Ser. No. 358,078, May 7, 1973, Pat. No. 3,883,725. This application Oct. 28, 1975, Ser. No. 626,138

The portion of the term of this patent subsequent to May 13, 1992, has been disclaimed.

Int. Cl.² G01V *1/28*

U.S. Cl. 235—151.3 **7 Claims**



1. In a data recording system having a repetitive source, in which on each repetition of said source one or more analog signals are detected, amplified and digitized to 1 bit, which are stored, and said stored 1 bit signals are read out of storage at selected command intervals to form trains of single bit signals, and said trains are transmitted to a data recording means, the method the method of recording and compositing said trains of single bit signals comprising the steps of:

a. running a rotating magnetic digital recording means at a substantially constant speed, said recording means having a plurality of spaced multi-bit storage locations;

b. responsive to a first command producing said first train of single bit signals representative of a first source;

c. recording in sequence, in a first digital memory each of the bits in said first train;

d. transferring said first train of single bit signals to said rotating magnetic digital storage means in said spaced multi-bit address locations;

e. repeating said source for a second time and responsive to a first command producing and transmitting to and recording in said first digital memory a second train of single bit digital signals representative of a second source;

f. reading out from said rotating magnetic digital recording means said digital signals stored in said spaced locations and transferring them to a second digital memory;

g. simultaneously reading samples of said second train of single bit signals from said first memory and said digital signals from said second memory;

h. adding said two signals to form a sum signal; and

i. storing said sum signals back on said rotating storage means in said spaced multi-bit locations.

4,021,650

VELOCITY COMMAND SIGNAL GENERATING APPARATUS

Frank D. Ruble, Hayward, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 19, 1975, Ser. No. 633,331

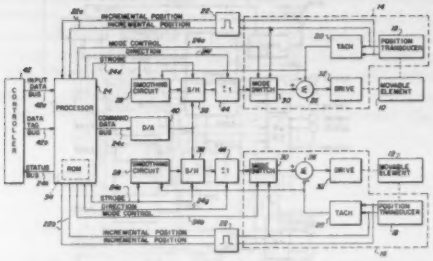
Int. Cl.² G06F *15/46*

U.S. Cl. 235—151.11 **27 Claims**

26. In a system for controlling the movements of a plurality of movable elements, said system including a plurality of servo control means respectively associated with and coupled to said plurality of movable elements, each servo control means

utilizing velocity command data as a reference input, apparatus for generating a velocity command signal representing a predetermined optimum velocity of movement of a selected one of said plurality of movable elements from its actual position to a desired stopping position, and means for applying said velocity command signal as a reference input to the servo control means associated with said selected movable element, the improvement comprised in that:

said apparatus includes means responsive to a first signal representative of the distance to be traveled by said selected movable element from its actual position to a desired stopping position for generating a second signal proportional to a predetermined optimum velocity of movement for each of said plurality of movable elements



when required to be moved a distance represented by said first signal, a plurality of multiplication means respectively associated with said plurality of movable elements, each multiplication means being coupled to said means for generating a second signal and being capable when enabled of multiplying said second signal by a constant representative of the particular motion characteristics of the associated movable element in order to form a velocity command signal representing the predetermined optimum velocity of movement for said associated movable element, and means coupled to each of said plurality of multiplication means and responsive to a third signal representative of the selection of said selected movable element for enabling the multiplication means associated with said selected movable element.

4,021,651

PROGRAMMED MANIPULATOR

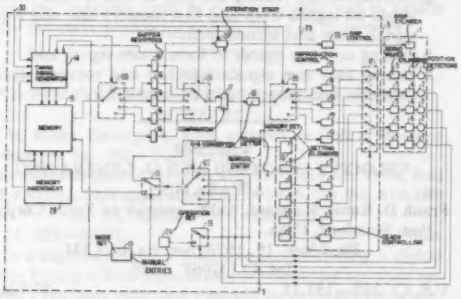
Kanzi Mitsuhashi; Kanji Matsushima, and Osamu Miki, all of Akashi, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Continuation-in-part of Ser. No. 371,632, June 20, 1973. This application Jan. 23, 1975, Ser. No. 543,597

Claims priority, application Japan, June 20, 1972, 47-61493

Int. Cl.[2] B25J *9/00*; G06F *15/46*

U.S. Cl. 235—151.11 **1 Claim**



1. In a programmed manipulator having a manipulating portion, a device for driving the manipulating portion in a plurality of different axes, a device for generating digital signals representing an actual position of the manipulating portion, a device for memorizing said digital signals thereby to produce digital instruction signals representing an objective position of the manipulating portion, a comparator comparing said instruction signals with said actual positional signals thereby to produce error signals, a device for controlling said driving device based on said error signals, said error signals are thereby reduced, and a device for controlling manually said driving device without depending on said error signals; the improvement comprising:

a memory revising region setting means for shifting the content of one region to another region in said memory device, when a step is defined to be an information group corresponding to a unit of operation, or for exchanging the contents of two regions between each other, sets the numbers A and B for leading step and the last step within a first region and also the numbers C and D for the leading step and the last step within a second region of memory in said memorizing device;

a plurality of up-down preset counters for storing signals indicative of said step numbers A and C delivered from said revising region setting means, and adding or subtracting 1 from the thus stored contents of the counters each time a pulse is received;

a plurality of buffer registers for holding the signals indicative of said step numbers B and D also delivered from said revising region setting means;

a first step number comparator which compares the output from one of said up-down preset counters with the output from one of said buffer register thereby to produce a difference signal and sends to the up-down preset counter an instruction for addition of subtraction depending on the sign of said difference signal;

a second step number comparator which compares the output of the other said up-down present counters with the output of the other of said buffer registers to produce a difference signal, and sends to the other of said up-down present counters an instruction for addition or subtraction depending on the sign of said difference signal;

a subtraction preset counter which stores the output of said first step number comparator, subtracts 1 from the thus stored content each time when a pulse is received, and when the content is found to be a predetermined state, produces an output indicative of said state;

a plurality of address calculating means for calculating actual addresses in the memory based on the outputs of both of said up-down preset counters;

a plurality of addition preset counters to store the address outputs from both of said address calculating means, respectively, and add "1" to the contents each time when a pulse is received therein until the additions are carried out in a number of times equal to the number of addresses included in said unit of operation constituting a step;

first means for selecting either one of the outputs from said addition preset counters twice for each pulse received and sending the selected output to said memory;

a plurality of buffer registers for holding respectively the contents of memorized addresses selected by said selecting means and sequentially delivered from said memory, and delivering the thus held contents into the memorizing addresses selected by said selecting means;

second means for selecting either one of the outputs from said buffer registers once for each pulse added to said addition preset counters and sends the thus selected output to said memory; and

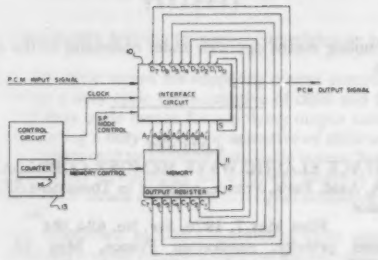
timing pulse generating means for delivering a first train of pulses to said subtraction preset counter and said up-down preset counters until the same pulse train is stopped by the output signal from the subtraction preset counter, said timing pulse generating means delivering a number of second train of pulses equal to the number of addresses for the memory unit constituting said step each time when one of said first train of pulses is received to said addition preset counters, said timing pulse generating means fur-

ther delivering for each of said second train of pulses a number of pulses required for making it possible to read out of said memory the contents in the addresses in said two regions in said memory, for the purpose of exchanging the contents between each other or of shifting one content to the address corresponding to the other content, and for making it possible to write the same into said memory.

4,021,652
INCREMENTALLY ADJUSTABLE DIGITAL ATTENUATOR/AMPLIFIER

Ernst August Munter, Ottawa, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Dec. 11, 1975, Ser. No. 639,848
Int. Cl.² G06F *7/38*
U.S. Cl. 235—152 **7 Claims**



2. A circuit for providing incrementally adjustable variation of signal levels in a pulse code modulation system wherein analog signal levels are represented by binary words encoded according to a predetermined law and resulting in a possibility of 2^n coded words for signals of each polarity, comprising:

memory means having at least a storage capacity for 2^n memory words, each one having an address corresponding to a respective one of said coded words and each one representing X db of signal level variation relative to its corresponding coded word;

an interface circuit adapted to selectively receive serial and parallel data and to selectively output serial and parallel data, said interface circuit having its parallel input connected to the output of the memory means and its parallel output connected to the address input of the memory means;

control means for effecting the loading of said interface circuit with one of said coded words, and for enabling the memory means to be addressed at the location defined by said coded word;

said control means including means for effecting the circulation of said one of said coded words through the memory means via said interface circuit a predetermined number of times M, a first memory address being defined by said one of said coded words and every subsequent address being defined by the memory word read out in the previous memory cycle, whereby the output from the memory means on termination of the last pass therethrough is a coded word representing MX db of signal level variation relative to said one of said coded words.

4,021,653
DIGITAL PROGRAMMABLE TONE DETECTOR

Ronald Edward Sharp, Lauderhill, and David Frank Willard, Plantation, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

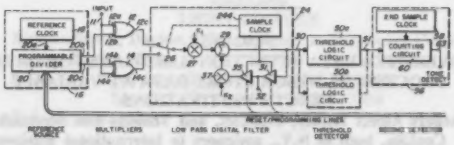
Filed Oct. 14, 1975, Ser. No. 621,711
Int. Cl.² G01R *23/02, 23/14*
U.S. Cl. 235—152 **26 Claims**

1. An improved digital detector arrangement for detecting the presence of a tone of a given frequency f comprising in combination:

reference signal generating means having first and second outputs, the first output producing a signal of frequency f at a first phase reference, the second output producing a signal of frequency f at a second phase reference predeterminedly related to the first phase reference;

a first mixer means for mixing the input signal with the reference generator first output;

a second mixer means for mixing the input signal with the reference generator second output;



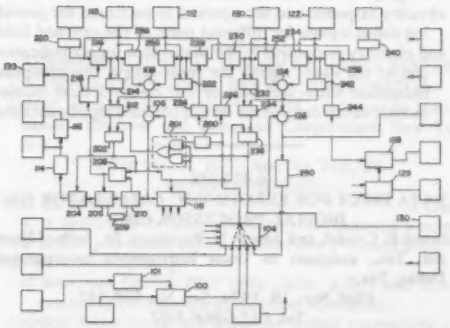
means times multiplexing the first and second mixer outputs through a digital low pass filter, said filter producing first and second digital outputs, each digital output representative of a vector component of the amplitude of the input tone; and

processing means for processing the filter digital outputs and producing a tone detect signal in response to the presence of predetermined first and second vector components, the processing means including means for determining the resultant vector of said first and second vector components and further comprising means for generating said tone detect signal in response to the amplitude of said resultant vector exceeding a given threshold level.

4,021,654
DIGITAL FILTER

Harvey H. Harris, Clearwater; Victor Lindberg, Largo, and Dale M. Walsh, Clearwater, all of Fla., assignors to Paradyne, Inc., Largo, Liechtenstein

Filed June 11, 1975, Ser. No. 586,020
Int. Cl.² G06F *7/38, 15/34*
U.S. Cl. 364—724 **5 Claims**



5. A digital device for processing a digital signal in cooperation with generator and storage means comprising in combination:

summation means;

first and second delay means;

first, second and third multiplier means connected to the generator and storage means;

means connecting said summation means to said first delay means and said first multiplier means to provide a first signal multiplied and delayed relative to the input signal thereto.

means connecting said second delay means and said second

multiplier means to the output of said first delay means to provide a second signal multiplied and delayed relative to the input signal thereto;

means connecting said third multiplier means to one of the respective outputs of said first and second delay means providing a third signal multiplied and delayed relative to the input signal thereto; and

means connecting said first, second, and third multiplier means to said summation means to provide an output signal comprising the sum of said first, second and third signals.

4,021,655

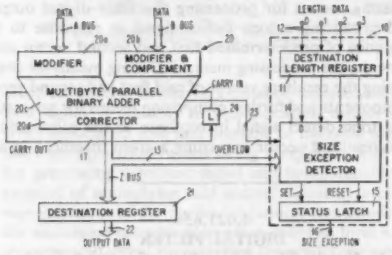
OVERSIZED DATA DETECTION HARDWARE FOR DATA PROCESSORS WHICH STORE DATA AT VARIABLE LENGTH DESTINATIONS

Robert Albert Healey, Endicott, and Thomas Leo Jeremiah, Conklin, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,857

Int. Cl.² G06F *13/00*

U.S. Cl. 235—156 **12 Claims**



1. In a data processing system for storing variable length operands in variable length destinations, wherein the destination length may be less than the length of the operand to be stored, the combination comprising:

circuitry for providing an indication of the destination length;

circuitry responsive to the operand to be stored for providing status signals for different parts of the operand field;

and circuitry responsive to the destination length indication and to the status signals for generating a size exception indication when the part of the operand field located outside of the destination length contains significant data.

4,021,656

DATA INPUT FOR ELECTRONIC CALCULATOR OR DIGITAL PROCESSOR CHIP

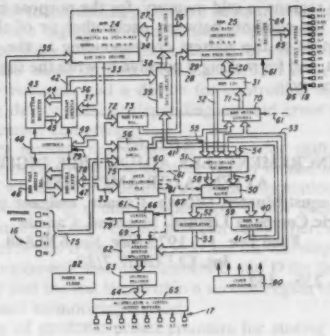
Edward R. Caudel, and Joseph H. Raymond, Jr., both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 19, 1974, Ser. No. 525,247

Int. Cl.² G06F *3/02*

U.S. Cl. 235—156 **9 Claims**

1. In an electronic calculator system of the type having data storage means, a read-only-memory for storing program instructions, an arithmetic unit for performing operations on data, control circuitry receiving program instructions from the read-only-memory and providing commands for defining the operation of the system, multiple digit display means, means for applying representations of data from the data storage means and sequential pulses to the display means, the sequential pulses and the representations of data being in time multiplex, keyboard means having inputs receiving the sequential pulses and having a plurality of outputs, the improvement wherein: coupling means connects the outputs of the keyboard directly to the input of the arithmetic means, and means connecting the control means to the coupling means whereby



the coupling means operates under command of the control means.

4,021,657

SURFACE ELASTIC WAVE MEMORY CORRELATOR

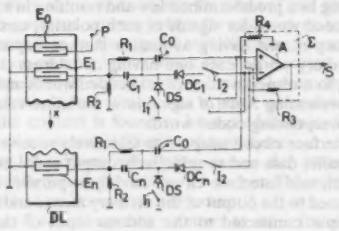
Bert A. Auld, Paris, France, assignor to Thomson-CSF, Paris, France

Filed May 7, 1976, Ser. No. 684,384

Claims priority, application France, May 13, 1975, 75.14877

Int. Cl.² G06G *7/19*; H03H *9/02*

U.S. Cl. 235—181 **7 Claims**



1. A device for correlating a first signal $V_1(t)$ with a second signal $V_2(t)$, which comprises:

a surface elastic wave delay line;

exciting means for exciting said delay line with successively a first and a second modulated carriers $V_1(t)$ cos. ωt and $V_2(t)$ cos ωt, producing a first and a second elastic waves propagating and extending along an axis on the surface of said delay line;

a set of read-out transducers uniformly distributed along said axis; said transducers being excited by said modulated carriers with the same phase;

sampling and storing means connected to said transducers for uniformly sampling said first surface elastic wave when it is wholly extended along said delay-line, storing a set of samples V_{1k};

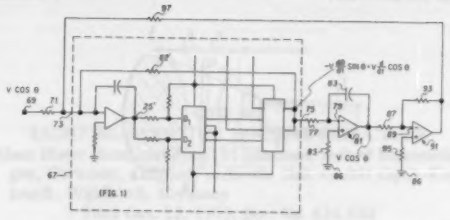
variable impedance elements connected to said sampling and storing means for receiving simultaneously said samples and a set of signals $V_{2k}(t)$ cos ωt produced on said transducers by said elastic wave, delivering a set of product signals V_{1k}, $V_{2k}(t)$ cos ωt; and

adder means for combining said product signals, delivering a third modulated carrier $V_3(t)$ cos ωt; the modulation signal $V_3(t)$ of said third modulated carrier representing, with the exception of a fixed delay, the correlation product of said first and second signals.

4,021,658
ANGULAR RATE DERIVING APPARATUS

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 22, 1975, Ser. No. 615,756
Int. Cl.² G06G 7/18, 7/22
U.S. Cl. 235—183 4 Claims



1. Angular rate deriving apparatus comprising, in combination:

first duty cycle means for supplying output control signals having a duty cycle representative of $d\theta/dt$ and $\text{Cos}\theta$;

second duty cycle means for supplying output control signals having a duty cycle representative of $d\theta/dt$ and $\text{Sin}\theta$;

means, connected to said first duty cycle means, for supplying a signal representing Sin θ thereto whereby said first duty cycle means converts it to a signal indicative of $d\theta/dt$ $\text{Cos}\theta$;

means, connected to said second duty cycle means, for supplying a signal representing $\text{Cos}\theta$ thereto whereby said second duty cycle means converts it to a signal indicative of $d\theta/dt$ $\text{Sin}\theta$;

first switch means, connected to said first duty cycle means for receiving control signals therefrom, for supplying output $\text{Cos}\theta$ representative signals at a duty cycle in accordance with received control signals whereby the output signals are representative of $d\theta/dt$ $\text{Cos}^2\theta$;

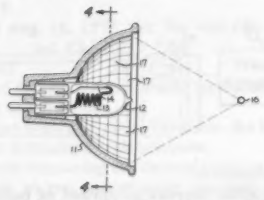
second switch means, connected to said second duty cycle means for receiving control signals therefrom, for supplying output $\text{Sin}\theta$ representative signals at a duty cycle in accordance with received control signals whereby the output signals are representative of $d\theta/dt$ $\text{Sin}^2\theta$; and

summing means connected to said first and second switch means for receiving the output signals therefrom, said summing supplying, as an output signal, an output representative of the rate of change, $(d\theta/dt)$, of the angle θ.

4,021,659
PROJECTOR LAMP REFLECTOR

Emmett H. Wiley, Chesterland, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,085
Int. Cl.² F21V 7/09, 7/00
U.S. Cl. 240—41.36 3 Claims

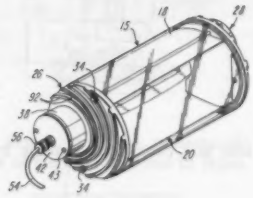


1. A reflector and lamp combination comprising a reflector having 9 concave reflecting surface shaped to form a plurality of radial bands and a plurality of circular bands each of which intersects each of said radial bands thereby forming a plurality of reflective facets, and a lamp positioned within the concavity of said reflector and comprising a helical filament positioned along the optical axis of said reflector and said lamp also comprising a filament conductor positioned substantially parallel to and spaced from said filament, whereby in operation said reflective facets laterally diverge light from said filament thereby reducing optical imaging of said filament conductor and axially diverge light from said filament thereby reducing optical imaging of said filament.

4,021,660
LIGHT FIXTURE

Roman Szpur, Dayton, Ohio, assignor to Panabeam Corporation, Dayton, Ohio

Filed Sept. 30, 1975, Ser. No. 618,136
Int. Cl.² F21V 17/00, 29/00, 15/04
U.S. Cl. 240—41.55 17 Claims



1. A method of producing a light fixture adapted for use in an environment of high moisture and/or high dust particles, comprising the steps of forming a primary reflector element having a generally U-shaped inner reflecting surface, inserting said primary reflector element axially into a light transmitting rigid tube having a center axis, securing a set of end closure members to opposite end portions of said tube, and supporting with one of said end closure members an elongated lamp element with its axis spaced eccentrically between the center axis of said tube and said inner reflecting surface of said reflector element.

4,021,661
SUBMARINE OPTICAL COMMUNICATION SYSTEM WITH FIBER OPTIC DEPTH COMPENSATOR

Arnold M. Levine, Chatsworth, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed May 1, 1975, Ser. No. 573,738
Int. Cl.² H04B 9/00
U.S. Cl. 250—199 7 Claims

1. A system for optical communication between a submarine submerged below the sea surface and a vehicle above the sea surface comprising:

at least one flexible fiber optic cable, a first end thereof extending through the hull of said submarine;

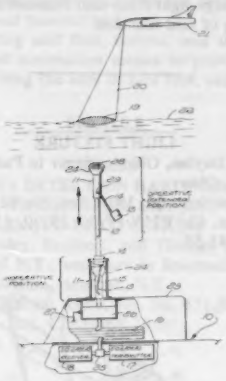
optical transmitting and receiving means operatively connected to said cable first end within said submarine for transmitting and receiving light energy signals through said cable;

flotation means connected to the second end of said cable for exerting an upward bouyancy force sufficient to extend said cable in an upward direction for a predetermined distance;

cable control means controllable from within said submarine for selectively permitting said flotation means to extend said cable to a first operative position and to rewind said cable to a second non-operative position;

and lens means associated with said flotation means and optically coupled to said cable second end to direct opti-

cal signals from said transmitting means generally upward and to direct external generally downwardly directed

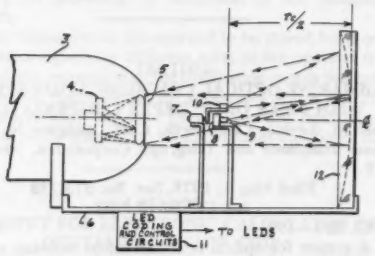


signals into said cable for reception by said receiving means.

4,021,662
LASER TARGET SIMULATOR

Vernon Mimms, Orlando, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 9, 1975, Ser. No. 594,421
Int. Cl.² G01J 1/20
U.S. Cl. 250—203 R 7 Claims



1. In combination with a laser seeker system having a light receiving aperture a laser target simulator comprising

a segment of concave spherical mirror having a radius of curvature r_c positioned to reflect light energy along the laser seeker system boresight toward said light receiving aperture,

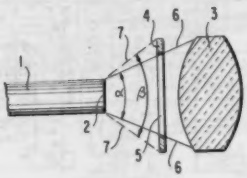
a first point source of light energy positioned on said laser seeker system boresight a distance r_{cft} from said mirror and oriented to project light energy toward said mirror in the direction of the mirror radius intercepted thereby, and

a second point source of light energy positioned in spaced adjacent relationship to said first source of light energy a distance r_{cft} from said mirror and oriented to project light energy toward said mirror in the direction of the mirror radius intercepted thereby.

4,021,663
AUTOMATIC EXPOSURE CONTROLLING PHOTOMETRIC DEVICE IN AN ENDOSCOPE

Nagashige Takahashi, No. 4-1, Nishi, Kokubunji, Tokyo, Japan

Filed Dec. 23, 1975, Ser. No. 643,655
Claims priority, application Japan, Dec. 26, 1974, 50-3927
Int. Cl.² G02B 5/14; H01J 5/16, 39/12
U.S. Cl. 250—227 7 Claims



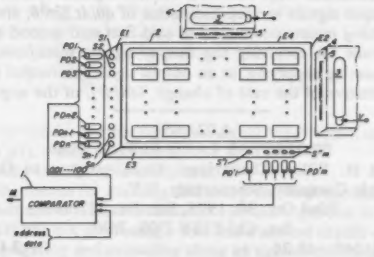
1. In an endoscope of the type having a fiber optic member forming a light transmission means and having a viewing lens spaced from an end of said fiber optic member for viewing image light emerging therefrom, and a photosensitive element for detecting variations in said image light, the improvement comprising:

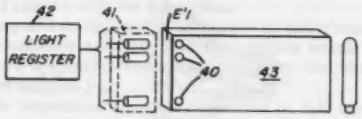
said viewing lens having a viewing angle of incidence less than the aperture angle of light emerging from the end of said fiber optic member, and said photosensitive element being positioned within said aperture angle of said image light emerging from said fiber optic member and just outside said viewing angle and facing the end of said fiber optic member from which said image light emerges.

4,021,664
STORAGE AND RETRIEVAL OF GRAPHIC INFORMATION

Thomas R. Ormsby, 1669 Lake Ave., Rochester, N.Y. 14615

Division of Ser. No. 429,224, Dec. 28, 1973, Pat. No. 3,882,468. This application Feb. 3, 1975, Ser. No. 546,660
Int. Cl.² G11B 23/40
U.S. Cl. 250—227 2 Claims





1. In combination:

a photographic support comprised of polyethylene terephthalate and capable of transmitting a beam of light through its cross-section in a plane parallel to its storage surface;

illuminating means located adjacent to a first edge of said support for producing a beam of light directed through said support toward a second edge of said support;

a code pattern recorded in the form of perforations which are selectively located along said second edge of said support for obstructing passage of such light and thereby optically modulating the directed light beam; and

light-responsive signal generating means located adjacent to said seond edge for converting the optically modulated beam emanating from said second edge into electrical signals.

4,021,665

LIGHT BEAM SWITCH HOUSING STRUCTURE

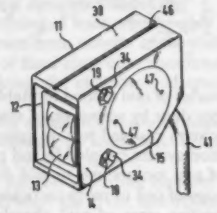
Klaus Dieter Haas, and Manfred Sillmann, both of Emmendingen, Germany, assignors to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Germany

Filed Oct. 22, 1975, Ser. No. 624,584

Claims priority, application Germany, Nov. 8, 1974, 2453097

Int. Cl.² H01J 5/02

U.S. Cl. 250—239 14 Claims



1. A light beam switch having a substantially rectangularly box-shaped, pressure-tight housing with a plurality of walls and containing at least one optical component with an optical axis, lens means disposed in one wall of said housing in sealing engagement therewith and aligned with each said component, two fastening means in each of two walls at right angles to one another and to said one wall, and a holder with means for receiving said two fastening means and connecting said housing to said holder and for pivotably adjusting said housing with respect to said holder about a first axis perpendicular to said optical axis and a second axis transverse to said first and optical axes.

4,021,666

NEUTRON-NEUTRON LOGGING FOR BOTH POROSITY AND MACROSCOPIC ABSORPTION CROSS SECTION

Linus S. Allen, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,686

Int. Cl.² G01V 5/00

U.S. Cl. 250—265 9 Claims

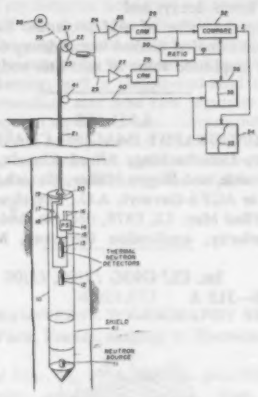
1. A method of logging the formations traversed by a borehole, comprising the steps of:

a. locating a fast source of neutrons within the borehole to irradiate the formations with neutrons,

b. simultaneously measuring the thermal neutron flux within said borehole at two spaced-apart positions where the ratio of the thermal neutron flux measurements is influenced predominantly by epithermal neutron parameters,

c. producing a ratio of the thermal neutron flux measurements at each of said two spaced-apart positions within the borehole, and

d. comparing the ratio of the thermal neutron flux measurements to at least one of said thermal neutron flux measurements in accordance with a known relationship to



provide an indication of the macroscopic absorption cross section of the formation and its fluids.

4,021,667

HIGH SPEED PULSE PROCESSING

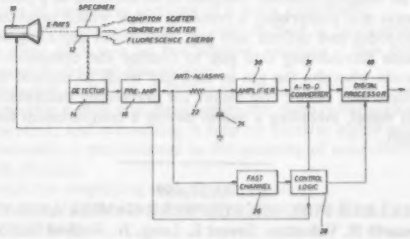
Kermit D. Clausen, Houston, and John R. Rhodes, Austin, both of Tex., assignors to Columbia Scientific Industries Corporation, Austin, Tex.

Continuation-in-part of Ser. No. 386,100, Aug. 6, 1973, Pat. No. 3,928,766. This application July 3, 1975, Ser. No. 592,756

The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.

Int. Cl.² G21K 1/00

U.S. Cl. 250—273 4 Claims



1. Method of processing energy charges from an energy-dispersive detector to determine the amplitude values of said charges, the detector operating in an emission spectroscopy system wherein a specimen under analysis is illuminated by a pulsable source capable of exciting characteristic X-rays, which comprises:

detecting a first energy charge with a long time constant circuit, the output therefrom being a first substantially linear decay;

sampling the amplitude value of said first linear decay and converting said sample value to digital form;

determining the slope of said first linear decay;

creating a second energy charge for detection by the detector by pulsing on said source, the output from the detector being a second substantially linear decay;

at a measurable time thereafter, sampling the amplitude

value of said second linear decay and converting said sampled value to digital form;

digitally projecting along the slope of said first linear decay the amplitude value at the time of the sampling of said second linear decay; and

subtracting the value of said projected first linear decay from said sampled second linear decay to determine the relative amplitude value of said first and second decays.

4,021,668
IONOGRAPHY IMAGING CHAMBER

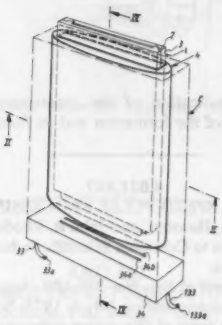
Josef Pfeifer, Unterhaching; Alfred Rheude, Munich; Kurt Thate, Munich, and Jürgen Müller, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 12, 1976, Ser. No. 666,410

Claims priority, application Germany, Mar. 26, 1975, 2513292

Int. Cl.² G03G *13/00, 15/00*

U.S. Cl. 250—315 A **26 Claims**



1. In an X-ray system wherein information is recorded as a pattern of electrostatic charges carried by an insulating charge-receiving medium while the medium is placed into a gap between spaced-apart first and second electrodes and the gap is filled with a compressed ionizable gas which has a high Z, an imaging chamber adapted to be exposed to a pattern of X-rays and comprising a pressure vessel which receives said electrodes and defines said gap, said vessel including sealing means surrounding said gap to confine the compressed gas therein whereby the gas in said gap tends to expand and to deform said vessel; and means for preventing deformation of said vessel, including a jacket having a compartment for said vessel.

4,021,669
NUCLEAR FUEL MICROSPHERE GAMMA ANALYZER

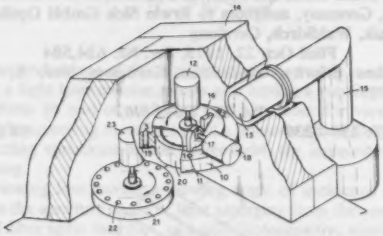
Kenneth H. Valentine; Ernest L. Long, Jr., both of Oak Ridge, and Melvin G. Willey, Knoxville, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 666,534

Int. Cl.² G01T *1/00*

U.S. Cl. 250—328 **4 Claims**

1. A gamma analyzer system for the analysis and sorting of radioactive particles, comprising a first sample changer turntable provided with three particle sample-receiving chambers positioned 120° apart; a first motor coupled to said first turntable for unidirectional rotation thereof to one of three positions; with respective ones of said chambers located at respective ones of said three positions; means aligned with one of said sample-receiving chambers for dispensing a desired number of said particles thereinto at a first one of said three positions; a gamma ray detector positioned adjacent to the next one of said chambers at the second one of said three positions for the acquisition of data from particles loaded therein while it was at said first one position; a second turntable positioned beneath said first turntable and provided with a plurality of respective receptacles; a second motor coupled to said second turntable for bidirectional rotation thereof such that a selected one of said receptacles is positioned in alignment with the third one of said chambers of said first turntable at the third one of said positions; a respective spring-loaded door mounted at the bottom of each of said sample-receiving chambers of said first turntable, a stationary electric solenoid positioned at said third one of said positions for sequentially operating each of said chamber doors at said third one of said positions such that when one of said chambers is at said third one of said positions, the already analyzed particles contained therein may be released therefrom into said selected aligned



one of said receptacles of said second turntable by opening the associated chamber door by activation of said solenoid; and a data acquistion system coupled to said gamma ray detector, said data acquisition system coupled to and providing control signals to each of said motors and to said door control solenoid wherein groups of one or more particles are sequentially loaded into respective ones of said chambers of said first turntable at said first one of said positions, respective ones of said loaded chambers are then sequentially analyzed by said detector at said second one of said positions, and finally respective ones of said loaded and analyzed chambers are sequentially unloaded into selected ones of said receptacles of said second turntable at said third one of said positions as a function of the analyzed results of said data acquisition system such that the sorting of particles is effected.

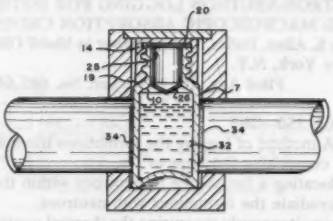
4,021,670
SEALABLE HIGH COUNTING EFFICIENCY LIQUID SCINTILLATION VIALS

John E. Noakes, Rte. 3 Barnett Shoals Bar H Estates, Athens, Ga. 30601

Filed Sept. 10, 1975, Ser. No. 612,087

Int. Cl.² G01T *1/204, 7/08*

U.S. Cl. 250—328 **20 Claims**



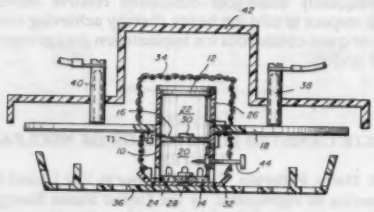
1. In a liquid scintillation counting apparatus having a sample vessel of the type adapted to be placed in a counter sample well opposite the face of a photosensing device, a sample vessel having an angular surface, a photon reflecting material on said angular surface, said angular surface being positioned in the path of photons emitted in a direction away from the

photosensing device, and said angular surface being disposed to reflect photons thus emitted back to the face of the photosensing device to reduce random dissipation of photons.

4,021,671
IONIZATION DETECTOR

Elias E. Solomon, Duxbury, Mass., assignor to Gulf & Western Manufacturing Company (Systems), New York, N.Y.

Filed July 7, 1975, Ser. No. 593,704
Int. Cl.² G01N *23/12*
U.S. Cl. 250—381 **19 Claims**

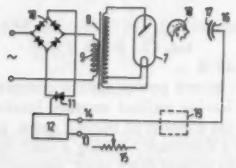


1. An ionization detector comprising;
a structure defining at least one chamber having means for receiving gases from outside of the chamber,
at least a pair of fixed electrodes associated with and at least in part defining the chamber and spaced from one another,
means including a radioactive source disposed in the chamber for establishing an ionization current in the chamber between the fixed electrodes,
an adjustable particle capturing member contained in the chamber between the fixed electrodes and movable to alter the ionization current,
means for supporting said particle capturing member independent of either fixed electrode with said member having an end extending into the chamber, the exposed area of said end within the chamber being variable to vary the number of particles captured thereby finely adjusting the ionization current,
and means coupled from one of the fixed electrodes for detecting changes in the ionization current.

4,021,672
DENTAL X-RAY DIAGNOSTIC INSTALLATION

Kurt Franke, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 1, 1975, Ser. No. 618,614
Claims priority, application Germany, Oct. 2, 1974, 2447075
Int. Cl.² H05G *1/30*
U.S. Cl. 250—402 **3 Claims**

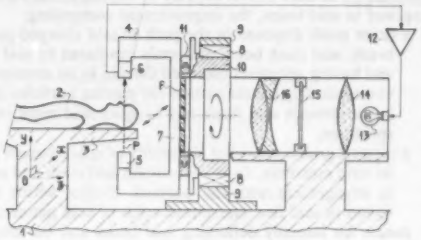


1. In a dental X-ray diagnostic installation including a unit rotatable about vertical axes, said unit being constituted of an X-ray tube and film carrier, and a support for retaining a patients' head between said X-ray tube and film carrier; a timing mechanism in said X-ray tube and film carried unit for preparing charting exposures at a fixedly preset exposure time; and setting means for adjusting at least one exposure value, the improvement comprising: a ray detector being applied to said film carrier; a dose rate regulator; an automatic exposure timer; said ray detector being interconnected with said setting means, dose rate regulator and automatic exposure timer, said ray detector delivering a signal corresponding to the X-ray dose rate so that the adjustable exposure value is influenced by the output signal of said ray detector to a value for maintaining constant the dose rate and providing an optimum film darkening, and a sample-and-hold circuit being connected intermediate said dose rate regulator and ray detector for storing said signal at a value corresponding to one of the lowest dose rates for a period of time which is required for the exposure of a plurality of teeth, said circuit having the output signal thereof transmitted to an actual value input of said dose rate regulator.

4,021,673
AXIAL TRANSVERSE TOMOGRAPHY SYSTEM

Jean Bossaert, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 15, 1976, Ser. No. 666,935
Claims priority, application France, Mar. 18, 1975, 75.08429
Int. Cl.² G03B *41/16*
U.S. Cl. 250—445 T **8 Claims**

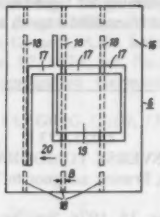


1. An axial transverse tomography system for obtaining pictures of transverse sections of a body, comprising:
a support displaceable about each section to be examined;
a source of X-rays on this support, emitting a thin pencil passing through this section;
a detector of X-rays on said support, receiveing the part of the thin pencil non-absorbed by the passage through said section, and converting it into an electric signal whose intensity is proportional to the quantity of non-absorbed X-photons;
means for amplifying said electric signal;
a source of light whose intensity is time modulated by said electric signal;
a photographic plate for receiving the light given out by the source of light;
an optical system placed between the source and the plate and comprising a filter, said system producing from the source in the plate a two dimensional picture, the light intensity of said picture being spatially constant along a first direction and spatially variable, in accordance with a predetermined law, along a second direction perpendicular to the first direction;
mechanical means acting on at least one element of the assembly: light source-optical system-photographic plate, and displacing it in synchronism with said support so that said first direction of the image on the photographic plate is constantly homothetic with the direction of the thin pencil on the examined transverse section;
said predetermined law being such that the median part of the picture on the plate has a maximum intensity with respect to the parallel parts surrounding it.

4,021,674
CHARGED-PARTICLE BEAM OPTICAL APPARATUS FOR IRRADIATING A SPECIMEN IN A TWO-DIMENSIONAL PATTERN

Hans Koops, Nieder-Ramstadt, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 26, 1975, Ser. No. 617,062
Claims priority, application Germany, Sept. 27, 1974, 2446789
Int. Cl.² H01J *37/00*
U.S. Cl. 250—492 A 2 Claims



1. In a charge-particle beam optical apparatus for the irradiation of a specimen in a two-dimensional pattern, said pattern having first areas which are unexposed to said beam and are surrounded at least almost entirely by second areas which are exposed to said beam, the improvement comprising:

a beam mask disposed in the path of said charged-particle beam, said mask being uniformly irradiated by said beam and having apertures disposed therein in an arrangement corresponding to said pattern for passing particles of said beam through said mask and imaging said mask on said specimen;

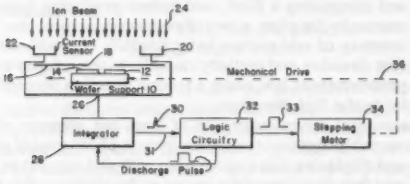
a support grid, comprising a plurality of spaced-apart parallel strip members, disposed beneath said mask and at least in engagement with the portions thereof which correspond to said first unexposed areas of said pattern; and

means for laterally deflecting said beam and the image of said mask and said strip members projected onto said specimen in a direction approximately perpendicular to the longitudinal axes of said strip members at least through a distance which is equal to the width of said strip members.

4,021,675
SYSTEM FOR CONTROLLING ION IMPLANTATION DOSAGE IN ELECTRONIC MATERIALS

Gordon A. Shifrin, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 333,913, Feb. 20, 1973, abandoned. This application Jan. 2, 1975, Ser. No. 538,287
Int. Cl.² G01N *23/00*
U.S. Cl. 250—492 A 15 Claims



1. A system for controlling the ion implantation dosage in electronic material including:

a. means for exposing a target area to an ion beam pattern or raster;

b. means for providing relative motion between said target area and said pattern or raster;

c. means for sampling and for incrementally integrating the ion beam current a plurality of times as said material is passed through said target area and for generating a control signal in response thereto; and

d. means responsive to said control signal for providing controlled relative movement between said beam pattern or raster and the actual target surface area upon which said beam falls, whereby a plurality of wafers may be continuously mounted and demounted at a surface which subsequently undergoes controlled relative movement with respect to said ion beam, thereby achieving continuous or quasi-continuous ion implantation dosage control of said wafers.

4,021,676
WASTE CANISTER FOR STORAGE OF NUCLEAR WASTES

James B. Duffy, Fullerton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 7, 1976, Ser. No. 684,421
Int. Cl.² G21F *5/00*
U.S. Cl. 250—506 4 Claims

1. A storage canister containng radioactive nuclear wastes in the form of a glass, radioactive isotopes being present therein in concentration sufficient to produce a large amount of heat, said canister comprising a canister body consisting of a side wall and top and bottom end caps, and a fin assembly disposed in the canister body, the fins extending from the center of the canister to a point spaced from the canister wall a distance effective to keep the temperature of the glass at the center of the canister at an acceptable level without producing unacceptable hot spots in the canister wall, the space between the end of the fin and the wall being filled with glass to provide thermal insulation between the fin and the wall.

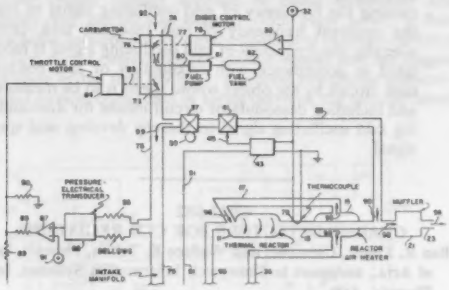
4,021,677
HYBRID POWER SYSTEM

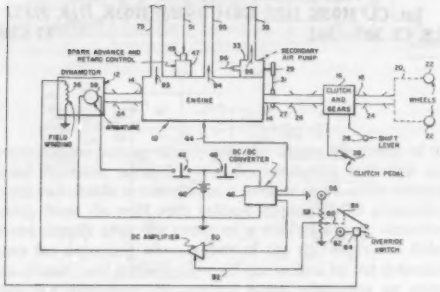
Charles Rosen, Teaneck, N.J., and Victor Wouk, New York, N.Y., assignors to Petro-Electric Motors, Ltd., New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,745
Int. Cl.² B60K *13/00*
U.S. Cl. 290—40 R 36 Claims

1. A parallel hybrid power system comprising combustion engine means having air/fuel mixture intake means, an exhaust port for the exhaust of burned gases, and a drive shaft; battery means; a dynamotor having a shaft coupled by a fixed mechanical ratio to said drive shaft, armature winding means coupled to said battery means, and field-winding means, said dynamotor being selectively operable to draw power from said battery means to aid said engine means in the turning of said drive shaft and for drawing power from said drive shaft to recharge said battery means; speed control means coupled to said dynamotor field-winding means for varying the current flow therein; means for controlling the intake of air/fuel mixture by said engine means such that the ratio of exhaust of said

engine means to the drive shaft speed remains substantially constant during normal operation of the power system as the current flow in said field-winding means is varied; thermal reactor means; means for directing the exhaust from said





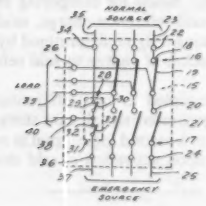
engine means to said thermal reactor means; and means coupled to and operated by said drive shaft for directing secondary air to said thermal reactor means at a rate which is directly proportional to the speed of said drive shaft.

4,021,678

AUTOMATIC TRANSFER SWITCH

William A. Moakler, Basking Ridge, and Charles Stotz, Upper Montclair, both of N.J., assignors to Automatic Switch Company, Florham Park, N.J.

Filed Jan. 19, 1976, Ser. No. 650,386
Int. Cl.² H02J *9/00*
U.S. Cl. 307—64 **10 Claims**



1. An automatic transfer switch for transferring an electrical load from a normal source of electric power to an emergency source of electric power, and vice versa, comprising:

a. a first set of phase switches for connection between the normal source and a load,

b. a second set of phase switches for connection between the emergency source and the load,

c. a first neutral switch for connection between a normal source neutral conductor and the load neutral conductor,

d. a second neutral switch for connection between an emergency source neutral conductor and the load neutral conductor,

e. actuator means for opening and closing said first set of phase switches,

f. actuator means operable independently of said actuator means (e) for opening and closing said second set of phase switches,

g. means responsive to operation of said actuator means (e) for closing said second neutral switch before said first set of phase switches opens, and for opening said second neutral switch after said first set of phase switches closes, and

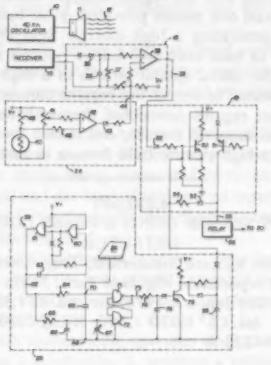
h. means responsive to operation of said actuator means (f) for closing said first neutral switch before said second set of phase switches opens, and for opening said first neutral switch after said second set of phase switches closes.

4,021,679

METHOD AND APPARATUS FOR AUTOMATIC SWITCHING

Fred Bolle; Chen Yi Lee, and Daniel A. Tardiff, all of Troy, Mich., assignors to Fred Bolle; Chen Yi Lee and Daniel A. Tardiff, all of Troy, Mich., part interest to each

Filed Oct. 22, 1975, Ser. No. 625,359
Int. Cl.² H01H *47/12*
U.S. Cl. 307—117 **12 Claims**



1. In the method for controlling a two-state switching means to regulate the artificial light in an area and including a capacitance comparison circuit having two branches normally capacitively imbalanced in a first direction, one branch of said capacitive comparison circuit including a metallic sheet, and including generating input signals to said capacitive comparison circuit, the improvement comprising:

changing the capacitance of said one branch of the capacitance comparison circuit by moving at least a portion of the human body into contactless proximity of the sheet;

converting said input signals into triggering signals when the capacitance in said one branch of said capacitance comparison circuit exceeds the capacitance in said other branch;

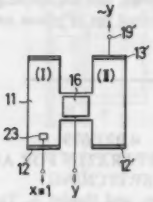
switching the two-state switching means in response to said triggering signals only when the magnitude of said triggering signals exceed a predetermined threshold; and

continuously monitoring the level of existing light in said area and changing said predetermined threshold between a first level and second level, depending upon the level of existing light in said area.

4,021,680
SEMICONDUCTOR DEVICE

Shoei Kataoka, Tanashi; Yasuo Komamiya, Yokohama; Mitsuo Kawashima, Tokorozawa; Nobuo Hashizume, Higashikurume, and Kazutaka Tomizawa, Kamagaya, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Division of Ser. No. 417,300, Nov. 19, 1973, abandoned, which is a continuation of Ser. No. 165,636, July 23, 1971, abandoned. This application Oct. 1, 1975, Ser. No. 618,555
Claims priority, application Japan, Aug. 25, 1970, 45-73840
Int. Cl.² H01L *47/02, 27/26, 31/16*
U.S. Cl. 307—216 15 Claims

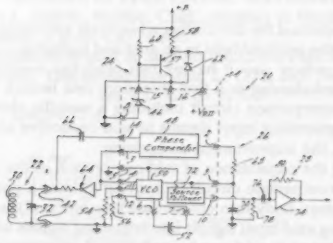


1. A bulk semiconductor device comprising a semiconductor element exhibiting a negative conductivity under a high electric field, said semiconductor element having at least two regions and at least one bridge portion, each said regions having two ohmic electrodes at the opposite ends thereof and being connected with the region adjacent thereto by a bridge portion, at least one means provided on at least one of said regions for generating a high electric field domain, means provided on or near each said bridge portion for selectively controlling the lateral spatial growth of a high electric field domain generated in one of the regions connected therewith into the other regions connected therewith responsive to a control signal supplied thereto, and means for detecting the existence of a high electric field domain in said other region.

4,021,681
RESONANT SENSOR USING A PHASE LOCKED LOOP DETECTOR

Frederick Otto Richard Miesterfeld, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jan. 22, 1976, Ser. No. 651,384
Int. Cl.³ H03D *13/00;* H03K *5/20*
U.S. Cl. 307—233 A 13 Claims

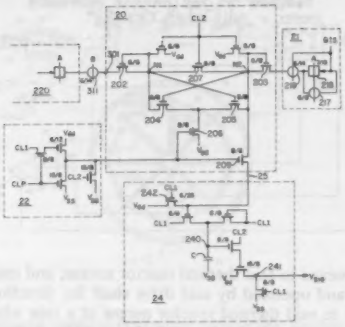


1. A speed sensor circuit for providing a speed signal representative of the speed of an object whose speed is to be measured comprising:
a resonant tank circuit;
means for modulating the resonant frequency of said tank circuit in accordance with the speed of the object whose speed is to be measured;
and a phase locked loop circuit comprising oscillator means providing an oscillating signal, means for locking said oscillating signal onto the resonant frequency of said resonant tank circuit comprising means for driving said resonant tank circuit from said oscillating signal and feedback loop closure means operatively coupled with said oscillator means and said resonant tank circuit for causing the frequency of said oscillating signal to track the resonant frequency of said resonant tank circuit whereby the frequency of said oscillating signal is modulated in accordance with modulation of said resonant tank circuit by the object whose speed is to be measured, and including demodulator circuit means for demodulating said oscillating signal to thereby develop said speed signal.

4,021,682
CHARGE DETECTORS FOR CCD REGISTERS

Ben R. Elmer, Glendale, and Wallace E. Tchon, Phoenix, both of Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed June 30, 1975, Ser. No. 591,667
Int. Cl.² H03K *5/20;* G11C *19/28;* H03K *5/18, 3/353*
U.S. Cl. 307—362 11 Claims



1. In combination with a CCD register system, apparatus for sensing packets of charge and amplifying said sensed packets to a logic level, said apparatus comprising:
reference means for generating reference charge by a clocked-source method of charge injection;
differentiator means including;
a first node coupled to a CCD register for receiving one of said packets of charge,
a second node coupled to said reference means for receiving said reference charge,
said differentiator means for comparing said one packet of charge to said reference charge, said differentiator means generating a signal determined by a relative size of said one packet of charge to said reference charge; and
storage means coupled to said differentiator means for storing said generated signal; said storage means producing a first or a second logic signal in response to said stored signal upon activation of said storage means.

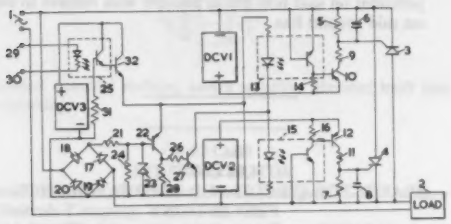
4,021,683
ELECTRONIC SWITCHING CIRCUITS

Reginald John Kingston Splatt, Farnham, England, assignor to National Research Development Corporation, London, England

Filed Dec. 31, 1975, Ser. No. 645,617
Claims priority, application United Kingdom, Jan. 3, 1975, 320/75; June 23, 1975, 26623/75
Int. Cl.² H03K *17/60, 17/78*
U.S. Cl. 307—252 UA 6 Claims

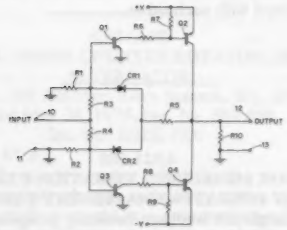
1. An electronic switching circuit for controlling a supply of

alternating current electricity to a load, including a bi-directional rectifier combination comprising first and second thyristors connected in parallel with opposite polarities, each thyristor having a trigger elecrtrode; first and second direct current trigger voltage supplies of equal magnitude and polarity but electrically isolated from each other; a first switchable semiconductor device connected in series between the first direct current trigger voltage supply and the trigger electrode of the first thyristor; a second switchable semiconductor device, connected in series between the second direct



current trigger voltage supply and the trigger electrode of the second thyristor; control means for rendering both first and second switchable semiconductor devices conductive simultaneously from the next zero voltage instant of the alternating current supply after the onset of a control signal; detection means for detecting when either of the thyristors has failed open-circuit; and inhibiting means controlled by the detection means for inhibiting the control signal whenever an open-circuit failure of either of the thyristors is detected by the detection means.

4,021,684
PUSH-PULL POWER AMPLIFIER
Frank G. Macey, Shrewsbury, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.
Filed Oct. 14, 1975, Ser. No. 621,642
Int. Cl.² H03K *5/01*
U.S. Cl. 307—268 **1 Claim**



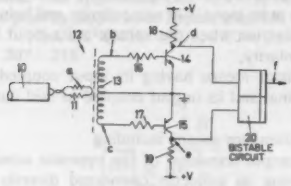
1. A push-pull amplifier circuit comprising
an input terminal for receiving an input signal;
an output terminal;
first transistor means having its input coupled to said input terminal and its output coupled to said output terminal;
said first transistor means including
a first output transistor of one conductivity type having its collector connected directly to said output terminal and its emitter connected to a voltage source of one polarity, and
a first input transistor of the opposite conductivity type having its base coupled to the input terminal and its collector coupled to the base of the first output transistor;
said first transistor means being biased to conduction when the voltage at its input is of one polarity and being biased to nonconduction when the voltage at its input is of the opposite polarity;
second transistor means having its input coupled to said input terminal and its output coupled to said output terminal;
said second transistor means including
a second output transistor of the opposite conductivity type having its collector connected directly to said output terminal and its emitter connected to a voltage source of the opposite polarity, and
a second input transistor of the one conductivity type having its base coupled to the input terminal and its collector coupled to the base of the second output transistor;
said second transistor means being biased to conduction when the voltage at its input is of said opposite polarity and being biased to nonconduction when the voltage at its input is of said one polarity; and
feedback means including
a first diode having a first terminal connected to the base of said second input transistor and having a second terminal,
a second diode having a first terminal connected to the base of said first input transistor and having a second terminal connected to the second terminal of said first diode, and
a resistance connected between the second terminals of said first and second diodes and said output terminal,
said first diode being connected between said output terminal and the base of said second input transistor so as to be forward biased when the first output transistor is conducting, and
said second diode being connected between said output terminal and the base of said first input transistor so as to be forward biased when the second output transistor is conducting;
said feedback means being operable when the first transistor means is conducting to produce a voltage of the one polarity at the input of the second transistor means and being operable when the second transistor means is conducting to produce a voltage of the opposite polarity at the input of the first transistor means;
said first transistor means being biased to conduction by the presence of a signal of the one polarity at the input terminal unless the feedback means is producing a voltage of the opposite polarity at the input of the first transistor means; and
said second transistor means being biased to conduction by the presence of a signal of the opposite polarity at the input terminal unless the feedback means is producing a voltage of the one polarity at the input of the second transistor means;
whereby when the input signal present at the input terminal changes from the one polarity to the opposite polarity said second transistor means is not biased to conduction until conduction terminates in the first transistor means, and when the input signal present at the input terminal changes from the opposite polarity to the one polarity said first transistor means is not biased to conduction until conduction terminates in the second transistor means.

4,021,685

PULSE CIRCUIT FOR RESHAPING LONG LINE PULSES

Laurence Goodall, Staines, and Eric John Leaton, Wokingham, both of England, assignors to Ferranti, Limited, Hollinwood, England

Filed July 2, 1975, Ser. No. 592,741
Int. Cl.² H03K 5/01
U.S. Cl. 307—268 7 Claims



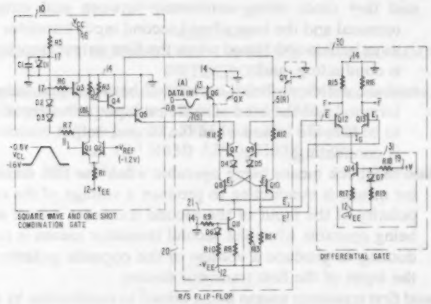
1. A pulse circuit for reshaping signal pulses received over a long line, which includes a transformer having a primary winding connected to the line and a centre-tapped secondary winding, the transformer and line together having a time constant such that differentiation of the received signal pulses takes place due to the action of the transformer and pulse forming means connected to the secondary winding to receive the output of the transformer and controlled by the differentiated signal pulses for reconstituting the original received pulse.

4,021,686

FLIP-FLOP WITH SETTING AND SENSING CIRCUITRY

Borys Zuk, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 12, 1975, Ser. No. 576,609
Int. Cl.² H03K 3/29
U.S. Cl. 307—291 17 Claims



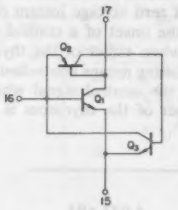
1. The combination comprising:
first and second transistors, each transistor having first and second electrodes defining the ends of a main conduction path and a control electrode;
means for producing a relatively constant current connected to the first electrodes of said first and second transistors;
means direct current coupling the second electrode of said first transistor to the control electrode of said second transistor;
means direct current coupling the second electrode of said second transistor to the control electrode of said first transistor;
first and second lines;
a first impedance means connected between the second electrode of said first transistor and said first line;
a second impedance means connected between the second electrode of said second transistor and said second line, each of said first and second impedance means for producing a voltage drop thereacross proportional to the current flowing therethrough; and
means connected to said first and second lines for selectively applying a difference in potential between said first and second lines, for causing one of said first and second transistors to conduct and the other one of said first and second transistors to be turned off when the potential on said first line is negative with respect to that on said second line; and for causing said other one of said first and second transistors to conduct and said one of said first and second transistors to be turned off when the potential on said first line is positive with respect to that on said second line.

4,021,687

TRANSISTOR CIRCUIT FOR DEEP SATURATION PREVENTION

Masayoshi Yoshimura, Tokyo, Japan, assignor to Hitachi, Ltd., Japan

Filed Nov. 5, 1975, Ser. No. 629,625
Claims priority, application Japan, Nov. 6, 1974, 49-127155
Int. Cl.² H03K 3/33
U.S. Cl. 307—300 8 Claims



1. A transistor circuit which comprises a first transistor of a first conductivity type, a second transistor of a second conductivity type and a third transistor of said first conductivity type, and in which a base of said first transistor, an emitter of said second transistor and a collector of said third transistor are electrically connected with one another, while a collector of said first transistor and a base of said second transistor are electrically connected with each other, and a collector of said second transistor and a base of said third transistor are electrically connected with each other.

4,021,688

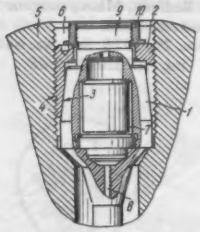
PICKUP FOR MEASURING VIBRATION PARAMETERS OF OPERATING MACHINERY PARTS

Valentin Georgievich Kudinov, Leninsky prospekt, 69, kv. 49, and Mikhail Dmitrievich Genkin, ulitsa Fersmana, 3, kv. 16, both of Moscow, U.S.S.R.

Continuation of Ser. No. 533,495, Dec. 17, 1974, abandoned.
This application Nov. 3, 1975, Ser. No. 628,424
Claims priority, application U.S.S.R., Dec. 18, 1973, 1974106
Int. Cl.² H01L 41/04
U.S. Cl. 310—8.7 4 Claims

1. A pickup for measuring vibration parameters of operating machinery parts, comprising: a housing shaped as a truncated cone; a collet into which the housing is inserted; the

collet having a conical internal surface conjugated with the conical surface of the housing; the collet having a cylindrical



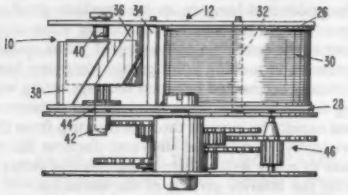
threaded external surface; and a sensitive element built into the housing.

4,021,689

STEPPING MOTOR

John J. Baltrush, Waterbury, Conn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Sept. 29, 1975, Ser. No. 617,751
Int. Cl.² H02K 7/10
U.S. Cl. 310—41 3 Claims



1. A stepping motor comprising

a rotatably movable rotor having mounted thereon a cylindrical permanent magnet,

two field poles, each of the field poles having a major and a minor pole with a flux gap therebetween and each of the field poles having an arcuate shape and being positioned so as to surround the cylindrical magnet of the rotor,

a coil energizable to magnetize the field poles,

each of the field poles being tilted and formed in the shape of a spiral section of a cylinder surrounding the cylindrical magnet so as to ensure rotation of the rotor in a single direction.

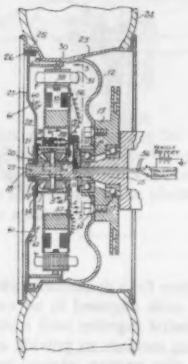
4,021,690

WHEEL BORNE COUNTER ROTATING DISC ALTERNATOR

Frank Burton, 300 Mil-Mar, Lee's Summit, Mo. 64063

Filed May 30, 1975, Ser. No. 582,080
Int. Cl.² H02K 7/00
U.S. Cl. 310—67 R 6 Claims

1. A wheel for use in a motor vehicle having an axle, comprising a substantially circular main body with a central hub portion for journalling on said axle, a rim peripherally secured on said main body and being shaped to receive a pneumatic tire, a generally circular outer wall member, means securing said wall member in the outer portion of said rim, said wall member being constructed to rotatably receive the axle through its central portion, an alternator stator assembly in said rim, means supportingly securing said stator assembly to the peripheral portion of the wall member, an alternator field assembly arranged concentrically in the stator assembly, means to support the field assembly on the axle, a field supply conductor, first circuit means connecting said field assembly to the field supply conductor, an output conductor, and second circuit means including a slip ring on said means to support the field assembly, contact brush means slidably engaging said slip ring and arranged to connect said stator assembly to said output conductor, and means for rotating said field assembly relative to the axle in a direction opposite to the direction of rotation of the stator assembly, said means for rotating



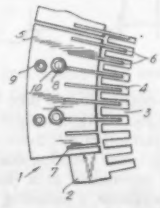
said field assembly comprising first and second bevel gears secured to said means to support the field assembly and the outer wall member, a coupling bevel gear between and meshing with said first and second bevel gears, and journal shaft means rotatably supporting said coupling bevel gear on a fixed axis perpendicular to the axle.

4,021,691

ELECTRICAL MACHINE STATOR

Alexandr Antonovich Dukshtau, Basseinaya ulitsa, 111, korpus 3, kv. 34; Samuil Alexandrovich Prutkovsky, ulitsa Sojuza Pechatnikov, 17, kv. 85; Felix Moiseevich Detinko, prospekt M. Toreza, 104, korpus 3, kv. 23; Jury Sergeevich Golubentsev, Kubinskaya ulitsa, 70, korpus 1, kv. 14, and Alexandr Nesanelevich Lurie, Belgradskaya ulitsa, 6, korpus 2, kv. 237, all of Leningrad, U.S.S.R.

Filed Feb. 18, 1975, Ser. No. 550,749
Int. Cl.² H02K 1/06
U.S. Cl. 310—217 10 Claims

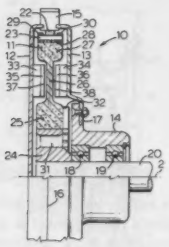


1. An electrical machine stator comprising an assembly of sheets forming a laminated iron core, and clamping means for clamping said sheets of said iron core together, said clamping means including clamping assemblies installed at each end of said core, and each clamping assembly including a plurality of non-magnetic steel fingers directly engaging an end sheet of the iron core and a clamping plate formed with slots respectively receiving said fingers with said fingers being rigidly fixed with said clamping plate.

4,021,692
PERIPHERAL COMMUTATOR FOR DISCOIDAL ARMATURE

Eric Whiteley, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Mar. 6, 1975, Ser. No. 556,119
Claims priority, application Canada, Mar. 13, 1974, 194865
Int. Cl.² H02K 1/22
U.S. Cl. 310—237 12 Claims

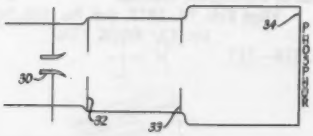


1. A discoidal armature for a dynamoelectric machine comprising a plurality of coils disposed in an overlapping, flat, circular array and bonded together with a strong, adherent, nonconductive bonding medium to provide a rigid discoidal structure including a disc portion integral with and coaxial with respect to inner and outer ring portions respectively; commutating means for said structure characterized by at least one ring of commutator segments on said outer ring portion, at the radial periphery thereof, coaxial therewith and connected to said coils; and means for securing said segments to said outer ring portion.

4,021,693
ELECTRON-OPTICAL IMAGE TUBE

Daniel Joseph Bradley, 73 Lambton Road, Wimbledon, London SW20, and Wilson Sibbett, 43 Dundonald Road, Kensal Green, London NW10, both of England

Filed June 9, 1975, Ser. No. 584,968
Claims priority, application United Kingdom, June 7, 1974, 25357/74
Int. Cl.² H01J 39/04, 39/00
U.S. Cl. 313—99 5 Claims



1. In an electron-optical image tube comprising a photocathode arranged to receive light images and convert them to photoelectrons, an extraction electrode consisting of a mesh immediately adjacent to the emission side of the photocathode and adapted to be mantained at a positive potential with respect to the photocathode, a focussing electrode on the side of the mesh remote from the photocathode; and deflection electrode means on the path of the photoelectrons beyond the focussing electrode, the improvement that the photocathode/-mesh spacing is of the order of 0.5 mm and the mesh/focussing electrode spacing is of the order of 30 mm, there being a drift section beyond said deflection electrode means, the drift section terminating in a screen for receiving the photoelectrons and including at least one annular electrode between the deflection electrode means and the screen preventing the scattering of electrons from the tube walls to the screen.

4,021,694
GETTERED INCANDESCENT LAMP AND METHOD OF MAKING SAME

George L. Duggan, Bedford, Mass., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 29, 1975, Ser. No. 644,892
Int. Cl.² H01J 19/68
U.S. Cl. 313—181 15 Claims

1. An incandescent lamp as an intermediate product comprising an envelope, a filament, conducting wires supporting the filament in the envelope, and a strip of getter metal having a vapor pressure at melting point greater than one hundredth Torr electrically connected between the supporting wires, the strip being dimensioned to form an electrical resistance effective to heat rapidly by current through the strip from the wires so as to violently vaporize the strip and disperse the metal in atomic state to many widely distributed reactive getter deposition sites on the interior surface of the envelope.

4,021,695
GASEOUS DISCHARGE DISPLAY PANEL OF MULTI-LAYER CONSTRUCTION

Takeo Kamegaya, Tokyo; Ryuichi Kaneko, Kawasaki; Hideomi Matsuzaki, Yokohama, and Yutaka Imahori, Kawasaki, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Filed Nov. 19, 1975, Ser. No. 633,260
Claims priority, application Japan, Nov. 22, 1974, 49-133606
Int. Cl.² H01J 61/067, 61/09
U.S. Cl. 313—188 25 Claims

1. A gaseous discharge display panel of multilayer construction comprising

a transparent front sheet of electrically insulating material;

a rear sheet of electrically insulating material;

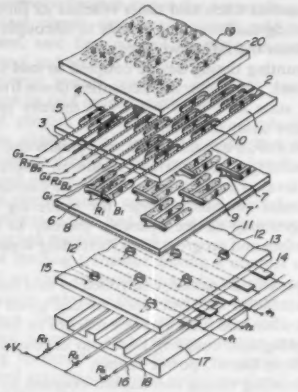
an intermediate sheet of electrically insulating material inserted between the front and rear sheets and having a number of first recesses formed in its front surface, the first recesses being shaped in elongated sections extending along the plane of the intermediate sheet, a number of second recesses formed in its rear surface, and a number of communication channels for communicating said first and second recesses at one end portions of the first recesses;

a number of anode means, each being provided near the other end portion of the respective first recess;

a number of hollow cathode means, each being provided between the rear surface of the intermediate sheet and an inner surface of the rear sheet at that portion of the respective second recess which is remote from a portion at which the communication channel is opened; and

a number of fluorescent layers, each being applied at least on bottom surface of the respective first recess; whereby

at least said front and intermediate sheets are hermetically sealed to form a number of elongated discharge spaces, each defined by the rear surface of the front sheet and the respective one of the first recesses formed in the intermediate sheet, said discharge spaces are communi-



cated with said second recesses through said communication channels and filled with an ionizable gas, and said fluorescent layers are excited by ultraviolet rays emitted from positive columns formed in the discharge spaces to produce visible light.

4,021,696

ULTRAVIOLET DISCHARGE LAMP

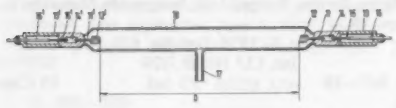
Andre Marc Victorin Taxil, Paris; Jacques Clement Divoux, Mesnil-le-Roi, and Joseph Henri Demaeyer, Villiers St Frederic, all of France, assignors to ITT Industries, Inc., New York, N.Y.

Filed Feb. 6, 1976, Ser. No. 656,053

Claims priority, application France, Feb. 14, 1975, 75.04586

Int. Cl.² H01J *61/18*

U.S. Cl. 313—229 **12 Claims**



1. A mercury-vapor discharge lamp for producing ultraviolet radiation of the type having a quartz tubular sealed envelope, thorium-coated tungsten electrodes, a quantity of mercury, a rare gas such as neon or argon, and a metallic element such as gallium, aluminum or indium, comprising:

a quantity of a halogenated organic compound in the gaseous state capable of reacting with a predetermined quantity of the metallic element when the lamp is operating.

4,021,697

CROSSED-FIELD AMPLIFIER

Oskar Doehler, Glen Ellyn; Gunter Dohler, Rolling Meadows, both of Ill., and Walter Friz, Dayton, Ohio, assignors to Warnecke Electron Tubes, Inc., Des Plaines, Ill.

Filed Dec. 10, 1975, Ser. No. 639,423

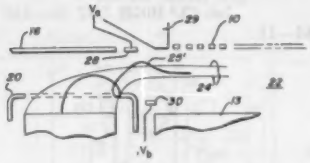
Int. Cl.² H01J *25/34*

U.S. Cl. 315—39.3 **10 Claims**

1. In a crossed-field amplifier having

an elongated interaction space with signal input and output terminals and an entrance for an electron beam and

a source of electrons adjacent said entrance for establishing an electron beam and an anode for directing said beam into said interaction space and a grid between the source



and the anode for modulating the flow of electrons from the source, the improvement comprising:

an auxiliary electrode adjacent the entrance of said interaction space for modifying the electron beam entering the interaction space.

4,021,698

CONTROL DEVICE FOR AUTOMATICALLY CONTROLLING THE QUANTITY OF LIGHT FROM FLASH APPARATUS

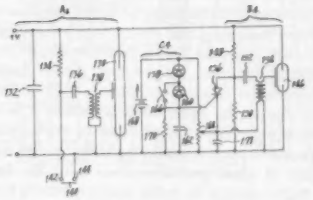
Seiji Yamada, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 13, 1976, Ser. No. 658,061

Claims priority, application Japan, Mar. 3, 1975, 50-26301

Int. Cl.² H05B *41/32*

U.S. Cl. 315—241 P **18 Claims**



1. Automatic control aparatus for controlling the quantity of light from a flash device, comprising:

means for generating light for illumination of a photographic object and including said flash device;

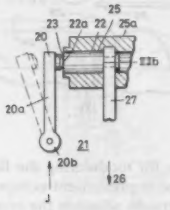
light measuring means comprising a first photocell device responsive to the light from said flash device, a second photocell device serially connected with said first photocell device and responsive to light reflected from the photographic object, means for integrating the output of photocurrent flowing through series circuit of said first and second photocell, and means for energizing said first and second photocell devices; and

means for preventing the light generated by said flash device from reaching said photographic object at the end of a time interval beginning with the energization of said flash device and ending when a given signal level is attained by said means for integrating.

4,021,699
DEVICE FOR LIMITING CURRENTS

Erhard Runtsch, Hemsbach, Germany, assignor to Brown, Boveri & Cie. A.G., Mannheim, Germany

Filed Aug. 13, 1975, Ser. No. 604,147
Claims priority, application Germany, Aug. 14, 1974, 2439066
Int. Cl.² H02H 7/22
U.S. Cl. 361—11 **6 Claims**

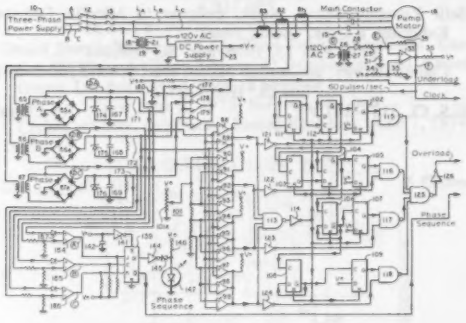


1. In combination, a current limiting device and at least one openable isolating point electrically connected therewith, said current limiting device comprising a variable, pressure-sensitive solid-state resistance, said resistance being variable from an initially relatively very low resistance or impedance value to a relatively very high resistance or impedance value when said isolating point is opened, said solid-state resistance being integrated into said isolating point as a switch contact member.

4,021,700
DIGITAL LOGIC CONTROL SYSTEM FOR THREE-PHASE SUBMERSIBLE PUMP MOTOR

David R. Ellis-Anwyl, Long Beach, Calif., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed June 4, 1975, Ser. No. 583,718
Int. Cl.² H02H 7/09
U.S. Cl. 361—28 **3 Claims**



1. A digital logic control system for controlling the coupling of a three-phase AC power supply, having a predetermined power line frequency, to a three-phase submersible pump motor to regulate the operation thereof, comprising:

coupling means for coupling the three-phase AC power supply to the submersible pump motor to energize and effect rotation of the motor;

a clock pulse source, coupled to said AC power supply, for producing precisely timed clock pulses periodically recurring at the power line frequency;

monitoring means for monitoring the three phase currents drawn by the pump motor from the AC power supply;

a pulse counting timer coupled to said clock pulse source and, when operable, counting down from a preset starting state to a final state and thereby providing, a predetermined time delay interval;

means, controlled by said monitoring means and responsive to the detection of an underload condition in which the amplitude level of at least one of the phase currents falls below a preset normal amplitude range, for rendering said pulse counting timer operable thereby to count said clock pulses and advance from its starting state to its final state;

underload protection means, controlled by said timer and operable at the termination of said predetermined time delay interval when said timer reaches its final state, for interrupting said coupling means to decouple the pump motor from the AC power supply;

a pulse counting timing device coupled to said clock pulse source and, when operable, counting down from a preset starting state to a final state, and thereby providing, a given time delay interval;

means, controlled by said monitoring means and responsive to the sensing of an overload condition wherein the amplitude level of at least one of the phase currents exceeds said normal amplitude range, for rendering said pulse counting timing device operable thereby to count said clock pulses and progress from its starting state to its final state;

overload protection means, controlled by said timing device and operable at the conclusion of said given time delay interval when said timing device reaches its final state, for interrupting said coupling means to decouple the pump motor from the AC power supply;

a pulse counting timing mechanism coupled to said clock pulse source and, when operable, counting down from a preset starting state to a final state, and thereby providing, a certain time delay interval;

means controlled by said underload protection means for rendering said timing mechanism operable, when the pump motor has been shutdown due to an underload condition, thereby to count said clock pulses and advance from its starting state to its final state;

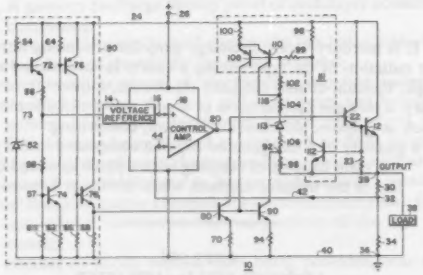
re-enabling means, controlled by said timing mechanism and operable when said certain time delay interval has elapsed after the pump has been shutdown, for automatically reconnecting the AC power supply to the pump motor to effect re-energization thereof;

and means for inhibiting the operation of said re-enabling means when the shutdown occurs in response to an overload conditon.

4,021,701
TRANSISTOR PROTECTION CIRCUIT

Robert Bruce Davies, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Dec. 8, 1975, Ser. No. 638,879
Int. Cl.² H02H 7/20
U.S. Cl. 361—18 **10 Claims**



1. A protection circuit for a protected transistor having emitter, base and collector electrodes, said emitter electrode being coupled to an output terminal, the protection circuit including in combination:

sense transistor means coupled to the protected transistor for providing a first control signal having a magnitude

proportional to the magnitude of a signal conducted by the protected transistor, said sense transistor means having first, second and control electrodes;

sense resistive means for providing a second control signal in response to said first control signal, said sense resistive means being coupled to said sense transistor means;

first control transistor means for responding to said second control signal developed across said sense resistive means, said first control transistor means having first, control and second electrodes;

first circuit means coupling said first control transistor means to said sense resistive means;

second control transistor means for selectively shunting drive signals away from the protected transistor, said second control transistor means having first, control and second electrodes;

second circuit means coupling said second control transistor means to said first control transistor means and to the protected transistor; and

voltage limiting transistor having a control electrode coupled to said control electrode of said second control transistor means, a first electrode coupled to a reference voltage conductor and a second electrode coupled to the output terminal, said voltage limiting transistor means being rendered conductive in response to said second control transistor means being rendered conductive to cause the voltage at the output terminal to be limited to a predetermined maximum magnitude.

4,021,702

ARRANGEMENT FOR DETECTING DEFICIENT OPERATIONAL CAPABILITY OF VACUUM SWITCHING VESSELS

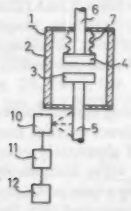
Manfred Rimmrott, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 564,378, April 2, 1975, abandoned. This application June 5, 1975, Ser. No. 584,007

Claims priority, application Germany, Apr. 2, 1974, 2416324

Int. Cl.² H02H *5/04*

U.S. Cl. 361—103 **5 Claims**



1. An arrangement for detecting deficient operational capability in a vacuum switching vessel having movable and fixed contacts comprising: radiation means for providing electromagnetic radiation indicative of a deficient operation of the switching vessel; and, detection and transducer means for receiving said electromagnetic radiation and evaluating the same for thereby, in turn, providing a signal indicative of said deficient operation.

4,021,703

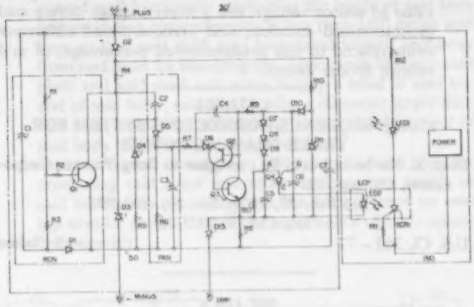
PHASE IMBALANCE DETECTION CIRCUIT

Wardell Gary; Glenn R. Taylor, both of Beaver, and Donald S. Kimmel, Monroeville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 2, 1975, Ser. No. 583,219

Int. Cl.² H02H *3/12*

U.S. Cl. 361—85 **18 Claims**



1. A direct current ripple detector, comprising:

a. positive input terminal means connected to the positive terminal of a voltage source of direct current which has a component of voltage ripple wherein:

b. negative input terminal means connected to the negative terminal of said source:

c. diode means having cathode means and anode means, said cathode means being connected to said negative input terminal means;

d. storage means, one terminal of which is connected to said positive input terminal means and another terminal of which is connected to said anode means for storing for a predetermined duration a stored voltage value which is generally equivalent to the highest value of voltage of said source;

e. voltage divider means connected in parallel circuit relationship with said storage means, said divider means having first and second output terminal means, said divider means providing a second voltage value in positive to negative voltage relationship between said first and said second output terminal means, respectively, said latter voltage value being equivalent to a predetermined percentage of said stored voltage value; and

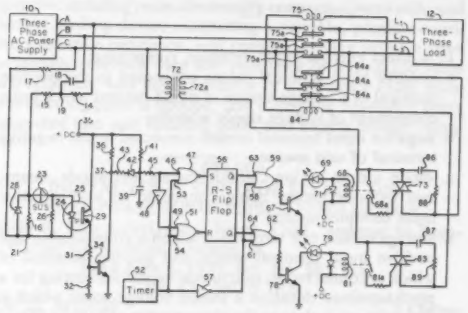
f. switch means having a first terminal means, a second terminal means and a gate terminal means for being turned on to a conducting state in response to the presence of a predetermined value of voltage which is oriented positive to negative from said gate terminal means to said second terminal means, respectively, and for being turned off to a nonconducting state in response to a second predetermined value of voltage which is oriented negative to positive from said gate terminal means to said second terminal means, respectively, said first termianl means being connected to said positive input terminal, said second terminal means being connected to said negative terminal means, said gate terminal means being connected to said first divider means output terminal means, said second voltage divider means output terminal means being connected to said anode means, said voltage between said first and said second terminal means of said switch being capable of varying generally instantaneously in relation to said component or ripple of said direct current voltage of said source, the voltage value at said second terminal means of said switch means relative to said voltage of said positive input terminal means generally tracking said components of ripple when said gate terminal means voltage of said switch means remains generally fixed at said highest value of voltage of said source for said predetermined duration, the presence of

said diode means allowing the latter relationship between said gate terminal means voltage and said second terminal means voltage to exist, said switch means therefore being turned off only when said second terminal means voltage is generally more positive than said gate terminal means voltage relative to the instantaneous voltage of said positive input terminal means to thereby indicate a predetermined difference in value between said stored highest value of source voltage and a lower voltage during said predetermined duration, said predetermined difference being related to said predetermined percentage, of said voltage divider means.

4,021,704
PHASE SEQUENCE CORRECTING SYSTEM FOR THREE-PHASE AC POWER

Dean K. Norbeck, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Feb. 27, 1976, Ser. No. 661,895
Int. Cl.² H02H 3/26
U.S. Cl. 361—77 5 Claims



1. A phase sequence correcting system for coupling a three-terminal, three-phase AC power supply to a three-terminal, phase sensitive load to apply three-phase power to the load in a desired rotation sequence, comprising:

phase sequence sensing means for detecting the phase rotation sequence of the three-phase AC power supply;

a memory device;

write-in means, responsive to said sensing means, for actuating said memory device to store information therein representing the phase sequence of the AC power supply;

inhibiting means for inhibiting the operation of said write-in means, when a predetermined time delay interval has elapsed after the system has been rendered operable, in order to lock the stored phase sequence information in said memory device;

read-out means for reading out the stored phase sequence information from said memory device;

and switching means, responsive to said read-out means, for interconnecting the three terminals of the three-phase AC power supply to the three terminals of the load in accordance with the interconnection pattern required to provide the load with desired phase sequence.

4,021,705
RESONANT TAG CIRCUITS HAVING ONE OR MORE FUSIBLE LINKS

George Jay Lichtblau, 106 W. Wooster St., Danbury, Conn. 06810

Filed Mar. 24, 1975, Ser. No. 561,085
Int. Cl.² H05K 1/04
U.S. Cl. 361—402 12 Claims

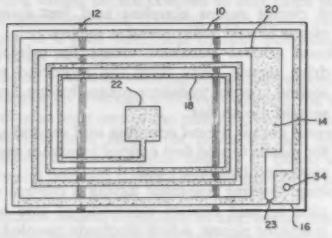
1. A multifrequency resonant tag circuit comprising:

a planar substrate of eletrically insulative material;

a first conductive path formed on a surface of said substrate in a configuration to define a first inductor;

a second conductive path formed on said substrate in a configuration to define a second inductor;

first and second pairs of conductive areas formed on said substrate, each pair having conductive areas in alignment on respective opposite surfaces of said substrate to define a capacitor, the conductive areas on each substrate surface being electrically connected to said paths on the common substrate surface at selected points to define first and second tuned circuits; and

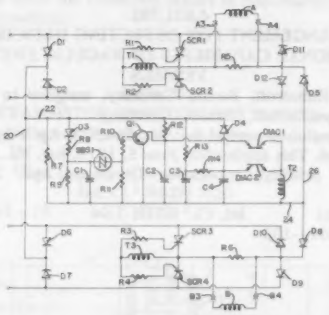


a conductive link having at least a portion of predetermined size, said link provided on a surface of said substrate in short circuit with at least a portion of one of said conductive paths and operative to fuse upon application of an energizing field to thereby alter the inductance of the associated conductive path and correspondingly alter the resonant properties of said tag circuit.

4,021,706
POWER TRANSMISSION

George A. McConnell, Southfield, Mich., assignor to Sperry Rand Corporation, Troy, Mich.

Filed Oct. 2, 1975, Ser. No. 618,866
Int. Cl.² H01A 47/00
U.S. Cl. 361—210 3 Claims



1. A solid state switching system for rectifying and modulating the application of direct current from an alternating current source to a pair of alternately energizable solenoids for operating a directional valve comprising a power circuit for each solenoid containing a pair of silicon controlled rectifiers and a pair of diodes connected in a bridge to supply a dual wave rectified current to the solenoid, a common trigger circuit coupled to each power circuit at the silicon controlled rectifier half of the bridge and comprising a first DIAC control circuit for providing a triggering pulse to the power circuit early in the cycle to provide full voltage to the solenoid, a second DIAC control circuit for providing a triggering pulse to the power circuit late in the cycle to provide a low voltage to the solenoid, a timing circuit including a transistor connected to disable the first DIAC control circuit when the transistor is biased to the on state and means for delaying the application

of a bias to the transistor, the timing circuit being connected to the power circuits through opposing diodes whereby energizing either power circuit will energize the timing circuit without energizing the other power circuit.

4,021,707
COMPENSATED PROBE FOR CAPACITIVE LEVEL MEASUREMENT

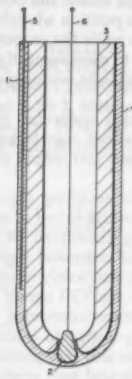
Rudolf Ehret, Schwetzingen, and Gerhard Hoyer, Oftersheim, both of Germany, assignors to Pfaudler-werke AG, Germany

Filed Oct. 6, 1975, Ser. No. 619,844

Claims priority, application Germany, Oct. 15, 1974, 2449097

Int. Cl.² H01G 7/00

U.S. Cl. 361—284 **4 Claims**



1. A probe for the capacitive level measurement of a liquid in a container, said probe being comprised of:

a rod-shaped conductive body for substantially vertical mounting with said container;

a first electrode embedded in insulation along the length of said rod shaped body,

a second electrode, at least a portion of which is at the lower end of said rod-shaped body below said first electrode; and

insulating means for electrically insulating said electrodes from said rod-shaped body so that each electrode forms a capacitor with said rod-shaped body.

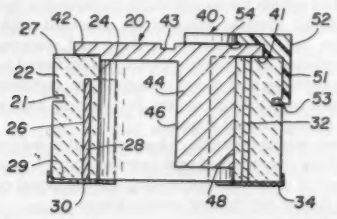
4,021,708
VERTICLE ADJUSTABLE CAPACITOR ASSEMBLY

Victor Insetta, Northport, and Harry V. Seaman, West Islip, both of N.Y., assignors to American Technical Ceramics, Division of Phase Industries, Inc., Huntington Station, N.Y.

Filed Oct. 29, 1975, Ser. No. 626,747

Int. Cl.² H01G 5/12

U.S. Cl. 361—295 **9 Claims**



1. A vertical adjustable capacitor assembly comprising:

a tubular dielectric body having a cylindrical axial bore, a flat top annular end and a flat bottom annular end;

a cylindrically curved conductive plate embedded in said body and closely spaced from said bore, said plate terminating at said bottom end of said body for connection to an external circuit;

a rotor having an electrical conductive shaft rotatably disposed in said bore, said shaft having an outer cylindrically curved wall frictionally contacting the inside of said bore and extending circumferentially less than 180° inside said bore so that said shaft may be rotated toward and away from said plate for changing the capacitance between said plate and said shaft said rotor having a head at said top end of said body, said head having a diameter larger than said bore to overlay and slidably contact said top end of said body when said rotor rotates; and

a retainer member mounted on said top end of said body for contacting said rotor and retaining the same axially in said bore while permitting rotation of said rotor on said top annular end to change the capacitance of said capacitor assembly.

4,021,709
METHOD AND DEVICE FOR CHARGING AN ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MATERIAL

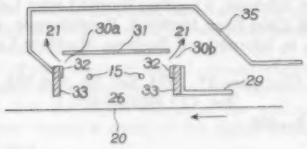
Nin-ichi Kamogawa, and Tohru Uchida, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 614,932

Claims priority, application Japan, Sept. 20, 1974, 49-109193

Int. Cl.² G03G 15/02

U.S. Cl. 361—229 **6 Claims**



1. A device for charging an electrophotographic photosensitive material comprising corona discharging electrodes, a shield member confining said discharging electrodes and having a first and at least one second openings, said photosensitive material being electrically charged through said first opening by corona current from said electrodes, and means to control the flow direction of an ion wind so as to exhaust the ion wind through said second opening and to apply the thus exhausted ion wind to a non-charged portion of the photosensitive material.

4,021,710
SPEED CONTROL SYSTEM FOR A CONTINUOUSLY OPERATING SHEET FEEDER

Frank Fichte, Taucha, and Wolfgang Paul, Leipzig, both of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed Mar. 27, 1975, Ser. No. 562,427

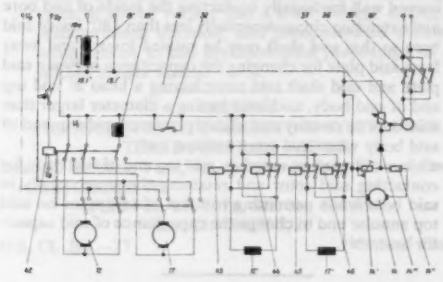
Claims priority, application Germany, Mar. 28, 1974, 177504

Int. Cl.² G05B 19/24

U.S. Cl. 318—39 **16 Claims**

1. In a sheet feeder system having distributor means for distributing sheets for processing and having transport means for receiving a stack of sheets and continuously transporting said stack at a speed varying in response to a control signal to said distributor means, a control system for furnishing said

control signal comprising, in combination, sensor means mounted in proximity to said distributor means for sensing the position of the top of said stack and furnishing a first sensor output signal when said top of said stack is correctly positioned relative to said sensor means, a second output signal when said position of said top of said stack is too low, and a third output signal when said position of said top of said stack



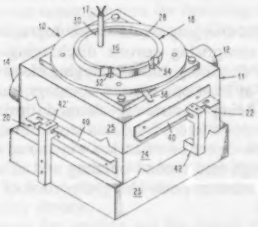
is too high relative to said sensor means; first means for furnishing a desired speed signal which varies in dependence upon the speed of operation of said distributor means; and control means connected to said first means, said sensor means and said transport means for furnishing said control signal to said transport means in dependence upon said desired speed signal and the then present one of said first, second and third sensor output signals.

4,021,711

ARTICLE POSITIONER WITH ZERO POSITION SENSING MEANS

John Joseph Erickson, Kingston; Harold Lester Leland, Hyde Park, and Einar Skau Mathisen, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 27, 1975, Ser. No. 590,774
Int. Cl.² H02H *3/00*
U.S. Cl. 318—480 **6 Claims**



1. In an article handling system comprising an X-Y table for supporting and moving the article, selectively actuated reversible X and Y stepping motors for moving said table in small increments to position the article in only one lineal direction along X and Y axes relative to zero positions on said axes, and motor control means responsive to digital control command signals including ones specifying the direction and extent of incrementing movement, to clock signals and to a GO signal, said table comprising a stationary first member, a second member mounted on said first member for movement along said X axis, and a third member mounted on said second member for movement along said Y axis, the improvement comprising the combination of:

X and Y zero position sensing means for detecting and defining said zero positions on said X and Y axis, each of said sensing means comprising

an opaque plate mounted on one of said members and having a first track including a first edge adjacent a cutout extending in one direction of movement and a second track including a second edge adjacent an opaque portion extending in said one direction of movement, said first and second edges extending perpendicularly to said one direction of movement,

light source means mounted on another of said members on one side of said opaque plate,

first and second light detectors mounted on said another of said members on the other side of said plate and providing output signals proportional to the amount of light received thereby, said detectors being respectively aligned with said first and second tracks, whereby relative movement between said one and another of said members produces a relative movement between said plate and said light source means and said detectors,

said plate, light source means and detectors being located to establish a zero position whereby the output of one detector increases while the output of the other detector decreases due to movement of said first and second edges between said light source means and said detectors,

and first circuit means connected to said detectors for comparing said output signals and providing a zero position signal when said output signals have a predetermined ratio;

a command register for receiving digital command signals defining the direction and extent of movement, said command register being connected to said motor control means to supply said command signals thereto whereby said motors are actuated solely in response to said command signals and to said GO signal;

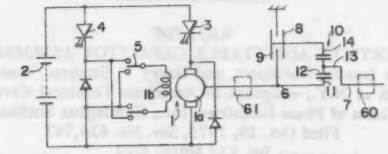
and second circuit means connected to said first circuit means and being operative to inhibit actuation of said motors in response to said zero position signal, to thereby position said table in said zero positions.

4,021,712

CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION FOR ELECTRIC AUTOMOBILES

Tomoo Ishihara, Tokyo; Toshimitsu Sakai, Toyota, and Yasufumi Yamada, Kariya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 7, 1975, Ser. No. 575,208
Claims priority, application Japan, May 10, 1974, 49-51314
Int. Cl.² H02P *5/06*
U.S. Cl. 318—432 **6 Claims**



1. A control system for an automatic transmission having an output shaft for electric automobiles provided with speed change gears having respective working and releasing sides directly connected to an electric motor and frictional coupling means for operating said speed change gears, comprising:

vehicle running control means for driving said electric motor during normal running,

changeover means operable, when actuated to interrupt the controlling operation of said running control means,

speed control means for controlling said frictional coupling means during the time of speed change,

said speed change control means generating a speed change signal to actuate said changeover means to perform a changeover operation during the period when the trans-

mission output shaft torque is varying until the vehicle speed and the motor speed are synchronized,

first means for detecting the transmitting force of said frictional coupling means,

second means for detecting motor output torque, and

torque setting means for controlling the motor output torque during the time of speed change responsive to said first and second means and to said speed change signal so as to eliminate fluctuation of the transmission output shaft torque.

4,021,713

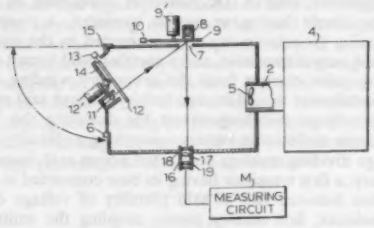
APPARATUS FOR SEQUENTIAL MEASUREMENT OF LIGHT TRANSMITTED THROUGH SMOKE

Shigeru Suga, Yoyogi 5-20-2, Shibuya, Tokyo, Japan

Filed Mar. 29, 1976, Ser. No. 671,700

Int. Cl.² G01D *5/36*; G01N *21/26*

U.S. Cl. 250—574 **6 Claims**



1. An apparatus for continuous and sequential measurement of amounts of reflected, diffused and directly transmitted light transmitted through smoke, said apparatus comprising:

a smoke chamber having a smoke introduction port and a smoke discharge port, and further having an aperture in one wall thereof;

a first light source aligned with said aperture, and a first sector member having an aperture therein, a white reflection portion and a black reflection portion spaced therearound and rotatably mounted for movement between said one chamber wall and said first light source for alignment of said aperture and said portions with said aperture in said one wall;

a light receiving device disposed on another wall of said smoke chamber opposite said aperture in said one wall, and a light measuring circuit coupled to said light receiving device;

a second light source in said smoke chamber directed toward said aperture in said one wall to strike said first sector member at an angle to the surface thereof, and a second sector member rotatably mounted in said smoke chamber for movement between said second light source and said aperture in said one wall and having an aperture therein for alignment with said second light source; and

sector member driving means connected to said sector members for driving them in synchronization for aligning the aperture in said second sector member with said second light source when the white reflection and black reflection portions of said first sector member are aligned with said aperture in said one wall, and for aligning the remainder of said second sector member with said second light source when the aperture in said first sector member is aligned with said first light source and said aperture in said one wall.

4,021,714

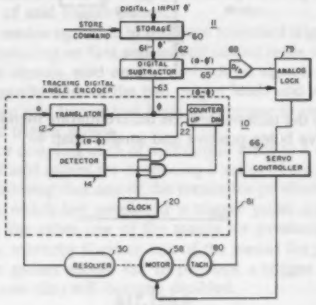
SERVO SYSTEM EMPLOYING A TRACKING DIGITAL ANGLE ENCODER

Donald H. Jones, Pittsburgh; Robert G. Burig, Allison Park, and Paul F. McNally, Gibsonia, all of Pa., assignors to Contraves-Goerz Corporation, Pittsburgh, Pa.

Filed Jan. 8, 1975, Ser. No. 539,265

Int. Cl.² G05B *11/18*

U.S. Cl. 318—594 **20 Claims**



1. An absolute positioning servo for positioning a movable member in response to a digital command input signal comprising:

analog position indicating means connected to the movable member, providing an analog output signal indicating the absolute position of the movable member;

analog to digital converter means connected to said analog position indicating means providing a digital output, of the same forth as the digital command input signal, corresponding to the position of the movable member;

coarse feedback control means connected to receive the output of said analog to digital converter and the digital command input signal for positioning the movable member so that the digital output of the analog to digital converter means is equal to the digital command input signal; and

fine feedback control means connected to compare the output of said analog position indicating means and the output of said analog to digital converter means for maintaining the position of the movable member within a distance, which is a fraction of the distance represented by one digital count of the digital command input signal, of the center point of the position indicated by the digital command input signal.

4,021,715

MOTOR DRIVE FOR THE DISPLACEMENT OF A SECTION OF AN X-RAY EXAMINATION APPARATUS

Reinhard Von Hacht, Halstenbek; Klaus Rennicke, Rellingen, and Walter Schmedemann, Hamburg, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 9, 1975, Ser. No. 539,699

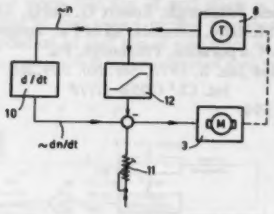
Claims priority, application Germany, Jan. 16, 1974, 2401853

Int. Cl.² G01N *21/34*

U.S. Cl. 318—628 **7 Claims**

1. A motor drive to be used in an X-ray examination apparatus for the displacement of a section of the apparatus, notably an imaging section, the speed and the direction of rotation of the motor being controllable in dependence of the value and the direction of a manual force acting on the section, a tachometer forming a signal proportional to the speed, the said signal also serving for the control of the motor, a further control signal being applied to the motor circuit in order to compensate for the weight of the section, characterized in that

the output signal of the tachometer is applied to the motor drive via a differentiating member, the loop gain in the loop



formed by the tachometer, the differentiating member and the motor drive being positive and smaller than 1.

4,021,716

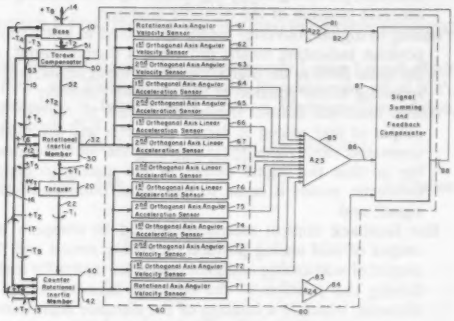
REACTIONLESS GIMBAL DRIVE SYSTEM

Arthur K. Rue, Palos Verdes, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 23, 1974, Ser. No. 535,385

Int. Cl.² B64L *17/02*

U.S. Cl. 318—648 **11 Claims**



1. In a substantially reactionless drive, supported by a base, having a torquer responsive to external electrical signals, a single degree of freedom rotational inertia member coupled to the torquer, and a single degree of freedom counter rotational inertia member coupled to the torquer and driven in a direction opposite to said rotational inertia member during operative mode of said drive, the improvement comprising in combination:

an elongated extension, integral with and perpendicular to the rotational inertia members positioned at the axis of rotation and coupled to the torquer;

a torque compensator comprising an electric motor coupling the base with the extension;

electronic means, the output of which is connected to the torque compensator; and

transducing means, comprising first transducers positioned at the periphery of the inertia members and second transducers positioned at the axis of rotation, coupling the rotational inertia members to the electronic means, said electronic means including a torque compensation loop electrically interlinking the rotational member, the counter rotational member and the torque compensator so as to feed back an electrical error correcting signal supplied by said transducers to the torque compensator, during operative mode of said drive.

4,021,717

CHARGING SYSTEM

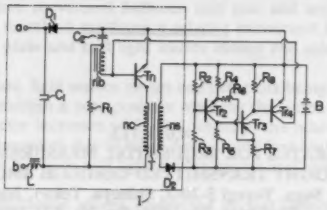
Haruhisa Furuishi, Suita; Katsuaki Kawamoto, Katano, and Yoneji Koyama, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 434,287, Jan. 17, 1974, abandoned. This application Mar. 17, 1975, Ser. No. 559,214

Claims priority, application Japan, May 16, 1973, 48-54966; May 16, 1973, 48-54967; Dec. 5, 1973, 48-137571

Int. Cl.² H02J *7/00;* **H02M** *3/22*

U.S. Cl. 320—39 **2 Claims**



1. A system for charging a storage battery comprising:

a. a high-frequency power supply circuit including a DC-DC converter, said DC-DC converter comprising an oscillator circuit having an output transistor, a transformer having its primary winding connected to the output of said output transistor, and a rectifier, said circuit supplying pulse current from the secondary winding of said transformer to said storage battery through said rectifier;

b. a voltage switching circuit for detecting the voltage across said storage battery comprising a plurality of voltage dividing resistors connected across said storage battery; a first transistor having its base connected to a junction between two of said plurality of voltage dividing resistors; first resistor means coupling the emitter and collector of said first transistor across said storage battery; a second transistor having its base connected to the collector of said first transistor, said second transistor being of the opposite conduction type from said first transistor; second resistor means coupling the emitter and collector of said second transistor across said storage battery; a resistor coupled between the emitters of said first and second transistors; and at least one amplifying transistor for amplifying the output of said second transistor, said voltage switching circuit detecting the voltage across said storage battery and being switched from its OFF state to its ON state when the voltage across said storage battery rises to a preset value; and

c. a feedback circuit coupling the last stage amplifying transistor of said voltage switching circuit across the base and emitter of said output transistor, said feedback circuit causing said high-frequency power supply circuit to stop oscillating in response to the turn-on of said voltage switching circuit.

4,021,718

BATTERY MONITORING APPARATUS

Charles Edward Konrad, Roanoke, Va., assignor to General Electric Company, New York, N.Y.

Filed Aug. 21, 1975, Ser. No. 606,615

Int. Cl.² H02J *7/00;* **G01N** *27/46*

U.S. Cl. 320—48 **13 Claims**

1. A circuit for monitoring the charge state of a battery during a period when the battery is driving a load and battery discharge current is subject to variations over a range of current magnitudes, said circuit comprising:

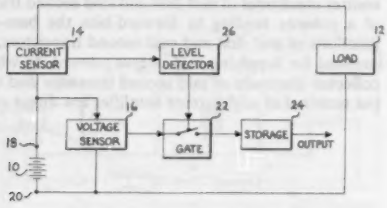
a. first sensing means connected in circuit with said battery to produce a first signal proportional to battery discharge current;

b. second sensing means connected in circuit with said

battery to produce a signal proportional to battery terminal voltage;

c. storage means comprising a signal input adapted to receive said signal proportional to battery terminal voltage, means for storing a signal representative of the signal at said signal input, and an output adapted to supply an electrical signal representative of said stored signal; and

d. gating means responsive to the value of said first signal and connected in circuit with said storage means to cause said signal proportional to battery voltage to be stored in said storage means solely during time intervals when said



first signal has a value representative of a predetermined level within said range of current magnitudes, and to preclude said signal proportional to battery voltage from being stored during intervals when said first signal has another value which is not representative of said predetermined level, whereby the output of said storage means is adapted to supply an updated electrical output signal representative of the level of battery terminal voltage occurring solely during the most recent interval when said battery discharge current is of said predetermined level within said range of current magnitudes.

4,021,719

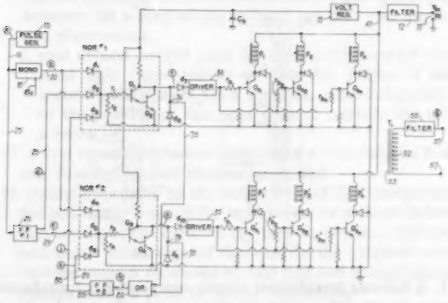
PROTECTIVE CIRCUIT FOR STATIC INVERTER

Bahechar S. Patel, Centerville, Ohio, assignor to AMF Incorporated, White Plains, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,820

Int. Cl.² H02M 1/18

U.S. Cl. 321—12 **6 Claims**



1. In a static inverter that includes at least first and second controllable conduction devices parallel connected to a d.c. source and alternately operable to conduct current from said d.c. source, and wherein said alternately operable conduction devices produce an a.c. signal in output means coupled thereto, the improvement of means for terminating operation of one of said controllable conduction device in the event that the other one fails to receive trigger pulses for operation thereby, said improvement comprising

means for producing a first series of trigger pulses which occur at a given repetition rate,

means for producing a second series of trigger pulses which occur at said given repetition rate and which occur in alteration with pulses of said first series,

means for coupling said first series of trigger pulses to one of said controllable conduction devices,

means for coupling said second series of trigger pulses to the other one of said controllable conduction devices,

means for coupling said controllable conduction devices to output means for producing therein an a.c. signal,

means coupled to said means for producing said first and said second series of trigger pulses for sensing the occurrence of said trigger pulses,

bistable means operable in response to sensed trigger pulses for producing on first and second output leads enable and inhibit signals, said enable and inhibit signals occurring on opposite ones of the two output leads and alternating between said two output leads in response to successively sensed trigger pulses,

means for coupling each of said output leads to a respective one of said means for producing a series of trigger pulses for inhibiting that one of the means for producing trigger pulses which last produced a trigger pulse and for enabling the other one of the means for producing trigger pulses, whereby if either one of the means for producing trigger pulses should fail to produce a trigger pulse the other one also will become disabled.

4,021,720

SWITCHING DEVICE FOR THE CONTROL OF, AND REDUCTION OF POWER LOSSES AND RADIO DISTURBANCES ASSOCIATED WITH CIRCUITRY, COMPRISING ONE OR MORE SWITCHING MEMBERS LOADED BY AN INDUCTANCE

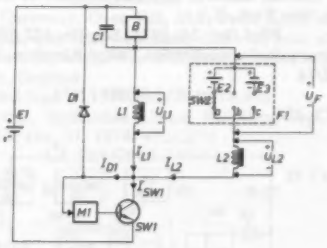
Sven N. J. Linnman, Akers Runo, Sweden, assignor to Per Udden AB, Akers Runo, Sweden

Filed Apr. 1, 1975, Ser. No. 564,083

Claims priority, application Sweden, Apr. 5, 1974, 74046343

Int. Cl.² H02M 7/537

U.S. Cl. 321—44 **17 Claims**



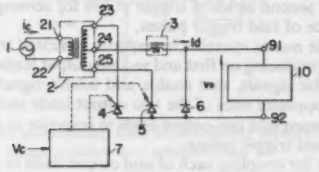
1. A switching device for controlling current flow in a circuit having a current source, a first inductive member, a load, and a switching member which supplies current from said source to the first inductive member when said switching member is conductive, said circuit being arranged to permit current to be supplied to the load from the first inductive member when the switching member becomes nonconductive, said switching device comprising:

a series circuit which includes said first inductive member, a second inductive member and a control member; and triggering means electrically connected between said series circuit and said switching member, said triggering means being responsive to the state of saturation of said second inductive member for controlling the conduction of said switching member.

4,021,721
AC-TO-DC CONVERTER

Kyozo Tachibana, Naka, Japan, assignor to Hitachi, Ltd., Japan

Filed July 14, 1975, Ser. No. 595,730
Claims priority, application Japan, July 15, 1974, 49-80126
Int. Cl.² H02M 7/155
U.S. Cl. 321—47 8 Claims

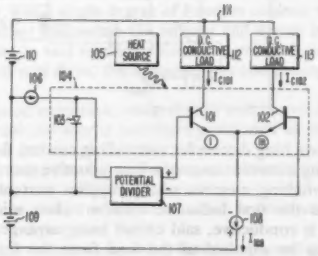


1. A controlled AC-to-DC converter comprising:
a transformer which is provided with at least three taps including a center tap and first and second taps led out symmetrically with respect to said center tap;
a first thyristor whose cathode is electrically connected to said first tap of said transformer;
a second thyristor whose cathode is electrically connected to said second tap of said transformer;
a diode whose cathode is electrically connected to said center tap of said transformer;
a first output terminal which is electrically connected to said cathode of said diode;
a second output terminal which is connected to anodes of said first thyristor, said second thyristor and said diode, a DC output being produced across said first and second output terminals; and
a retardation coil which is incorporated between said center tap and an electrical juncture between said cathode of said diode and said first output terminal.

4,021,722
TEMPERATURE-SENSITIVE CURRENT DIVIDER

Brian Crowle, Ashford, England, assignor to RCA Corporation, New York, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,559
Claims priority, application United Kingdom, Nov. 4, 1974, 47592/74
Int. Cl.² G05D 23/20
U.S. Cl. 323—4 5 Claims

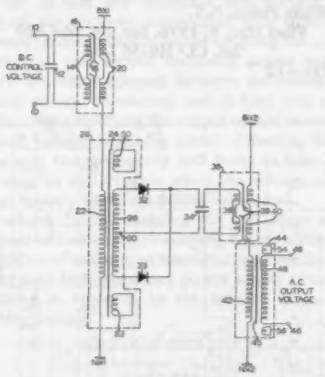


4. A circuit providing an output current responsive to temperature, said circuit comprising:
first and second transistors of the same conductivity type, each having base and emitter electrodes with a base-emitter junction therebetween arranged to be operated substantially at said temperature and having a collector electrode, said first transistor being designed to have a collector current m times as large as said second transistor for the same values of base-emitter potential;
means responsive to said temperature for applying a negative-temperature-coefficient potential between the respective base electrodes of said first and said second transistors;
a current amplifier having an input terminal to which the collector electrode of said first transistor is direct coupled, having an output terminal and exhibiting a current gain of −G between its input and output terminals, where G is a positive number;
means for applying current to an interconnection of the emitter electrodes of said first and said second transistors of a polarity tending to forward-bias the base-emitter junctions of said first and said second transistors; and
a terminal for supplying said output current, to which the collector electrode of said second transistor and the output terminal of said current amplifier are direct coupled.

4,021,723
FAIL-SAFE TRANSFORMER CIRCUIT

Humphrey Roachsmith, Corsham, England, assignor to Westinghouse Brake & Signal Company Limited, England

Filed Apr. 15, 1976, Ser. No. 677,328
Claims priority, application United Kingdom, May 17, 1975, 21078/75
Int. Cl.² G05F 3/04
U.S. Cl. 323—50 10 Claims

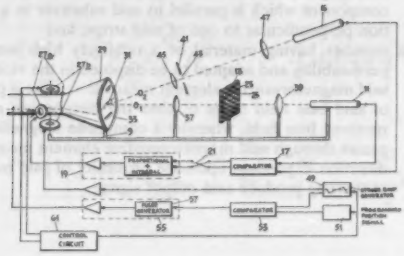


1. A fail-safe transformer circuit comprising, a transductor having input and output windings, a transformer having a primary, a secondary and at least one closed tertiary winding, said input winding of said transductor coupled to a d.c. control signal, said output winding of said transconductor and said primary winding of said transformer connected in series and connected across an a.c. supply source for inducing a.c. voltage signals into said secondary winding of said transformer when a d.c. control signal is applied to said input winding of said transconductor and for causng the closed tertiary winding of said transformer to load the transformer so that little, if any, a.c. voltage signals are induced into said secondary winding of said transformer in the absence of a d.c. control signal on the input winding of said transductor.

4,021,724
APPARATUS FOR USE IN DETERMINING A CHARACTERISTIC OF A CATHODE RAY TUBE

John Rawcliffe, Atherton, near Manchester, and John McLauchlan Vassie, Barnston, Wirral, both of England, assignors to Elliott Brothers (London) Limited, Chelmsford, England

Filed Dec. 29, 1975, Ser. No. 644,630
Claims priority, application United Kingdom, Jan. 2, 1975, 53/75
Int. Cl.² G01R *31/024*
U.S. Cl. 324—20 CR **7 Claims**



1. Apparatus for use in ascertaining the characteristic of a cathode ray tube relating luminous spot position to deflection current, said apparatus comprising:

A. a locating means for a cathode ray tube;

B. a first photosensor;

C. optical means defining a first optical path between the screen of a cathode ray tube located by said locating means and the first photosensor;

D. a graticule disposed in said first optical path,

i. said graticule containing a predetermined spatial distribution of light transmissive and non-transmissive areas,

ii. the first optical path including imaging means operative to form a real image of a luminous spot on said cathode ray tube screen at a corresponding position on said graticule so that the output of said first photosensor has a value dependent on the position of said spot on the cathode ray tube screen;

E. a second photosensor;

F. further optical means which defines a second optical path between the screen of the cathode ray tube and the second photosensor,

i. said second optical path having a predetermind constant light transmissivity so that the output of said second photosensor has a constant value independent of the position of said spot on said cathode ray tube screen;

G. a first signal comparator responsive to the outputs from said first and second photosensors; and

H. means responsive to the output of said first comparator for producing a signal for application to a beam deflection means of the cathode ray tube to position said spot and hence said image of the spot on the graticule such that the outputs produced by said first and second photosensors are in a predetermined relationship.

4,021,725
MOBILE MINE DETECTION SYSTEM HAVING PLURAL COLOR DISPLAY

James L. Kirkland, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

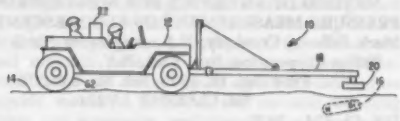
Filed Mar. 5, 1976, Ser. No. 664,223
Int. Cl.² G01V *3/08*
U.S. Cl. 324—3 **10 Claims**

1. Detection apparatus operative to distinguish between and generate a plural color display representative of first and second magnetic pole characteristics of metal objects that affect a magnetic field, said apparatus comprising:

a vehicle adapted for movement along a directed course over a surface beneath which said objects are likely to be disposed;

magnetic field sensing means, mounted on said vehicle, for generating analog voltage signals of first and second voltage polarity corresponding respectively to said first and second magnetic pole characteristics;

scanner means, connected to said sensing means, for causing said sensing means to repetitiously effect scanning of said surface transversely of said directed course so as to detect variations in magnetic field in accordance with said magnetic pole characteristics over a scanned area as said vehicle



first deflection signal generating means, responsive to said movement along a directed course, for generating first deflection signals corresponding to said movement;

second deflection signal generating means, coupled to said scanner means for generating second deflection signals corresponding to said scaning;

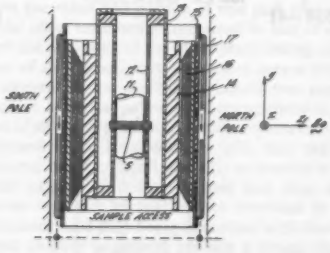
voltage polarity detector means, coupled to said sensing means, for separating said analog signals into first polarity analog signals and second polarity analog signals representative of said first and second magnetic pole characteristics, respectively; and

display means, responsive to said first and second polarity analog signals and to said first and second deflection signals, for providing a plural color map-like display of said variations in said first and second magnetic pole characteristics in relation to said scanned area of said surface traversed by said apparatus.

4,021,726
IMAGE FORMATION USING NUCLEAR MAGNETIC RESONANCE

Allen Nathan Garroway, Oxon Hill, Md.; Peter Kevin Grannell, Newcastle, and Peter Mansfield, Chilwell, both of England, assignors to National Research Development Corporation, London, England

Filed Sept. 4, 1975, Ser. No. 610,436
Claims priority, application United Kingdom, Sept. 11, 1974, 39625/74; Oct. 31, 1974, 47213/74
Int. Cl.² G01R *33/08*
U.S. Cl. 324—.5 A **10 Claims**



1. Nuclear magnetic resonance apparatus comprising means for applying a static magnetic field to a sample along one axis, means for applying a magnetic field gradient along said one axis to said magnetic field which varies along said one axis,

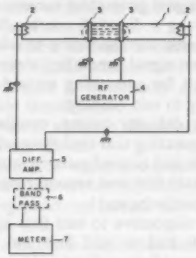
means for applying a gradient to said magnetic field along said one axis and which varies in at least one direction orthogonal to said one axis, means for applying radio frequency signals having selected frequency components to such sample to selectively excite a predetermined region of said sample to which a predetermined gradient has been applied, means for switching the said magnetic field gradients in sequence simultaneously with the application of said RF signals so as to preferentially excite only certain regions of the sample associated with said predetermined gradients and leave other regions effectively unexcited, and means for enabling the free induction decay signal from the sample to be read out.

4,021,727

METHOD OF AN DEVICE FOR NON-DESTRUCTIVE PRESSURE MEASUREMENT OF FLUORESCENT LAMPS

Mark Fellows, Cranbury, N.J., assignor to North American Philips Corporation, New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,270
Int. Cl.² G01R *31/024*
U.S. Cl. 324—20 R **7 Claims**



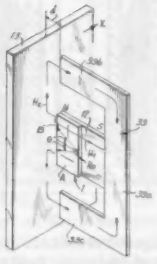
1. A method of non-destructive pressure measurement of fluorescent lamps comprising the steps of applying a RF field to a central portion of the lamp to ionize the fill gas in the central portion, and measuring the strength of the signal resulting between the terminal electrodes of the lamp as an indication of the fill gas pressure.

4,021,728

MAGNETIC FIELD SENSING APPARATUS FOR SENSING THE PROXIMITY OF A MEMBER HAVING HIGH MAGNETIC PERMEABILITY WITHOUT REQUIRING AN EXTERNAL FIELD SOURCE

Yoshimi Makino, Fujisawa, and Hiroyuki Ookubo, Chiba, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 22, 1975, Ser. No. 642,997
Claims priority, application Japan, Dec. 29, 1974, 50-2141
Int. Cl.² G01R *33/12*
U.S. Cl. 324—41 **17 Claims**



1. Apparatus for producing an output signal upon sensing the proximity of a member having material of a relatively high magnetic permeability, comprising:

magnetoresistive element means comprised of an insulating substrate and perpendicularly disposed ferromagnetic strips on said substrate for providing first and second main current conducting paths between a pair of current supply terminals, said strips being connected in series to define a junction therebetween from which an output signal is derived;

a bias magnet for providing a bias magnetic field which passes through said magnetoresistive element means, said magnetoresistive element means being mounted on said bias magnet, and said bias magnetic field having at least a component which is parallel to said substrate in a direction perpendicular to one of said strips; and

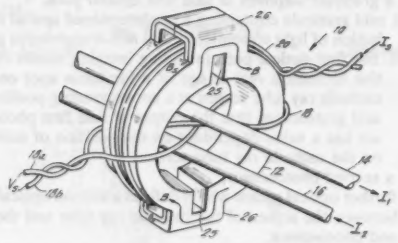
a member having material of a relatively high magnetic permeability and adapted to be disposed in the vicinity of said magnetoresistive element means to receive a portion of said bias field so as to alter the distribution of said received bias field, whereby a composite magnetic field passes through said magnetoresistive element means in a direction dependent upon the proximity of said member to thereby produce said output signal.

4,021,729

CROSS-FIELD GROUND FAULT SENSOR

Edward C. Hudson, Jr., Derry, N.H., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Dec. 3, 1975, Ser. No. 637,233
Int. Cl.² G01R *31/02, 19/16*
U.S. Cl. 324—51 **24 Claims**



1. A ground fault sensing circuit, comprising:

a first magnetic core having an air gap therein;

a first primary winding connected between one terminal of an A.C. source and one terminal of a load, a second primary winding connected between a second terminal of said A.C. source and a second terminal of said load, said primary windings being coupled to said first core in such a manner as to produce oppositely directed fluxes in said first core;

a secondary winding coupled to said first core to have induced therein a voltage related to the difference in magnitude of the currents flowing in said first and second primary windings;

a second magnetic core magnetically coupled to said first core in parallel magnetic circuit relationship with said air gap so as to provide an alternate magnetic path for said oppositely directed fluxes induced in said first core whenever said second core is not saturated;

a control winding coupled to said second core;

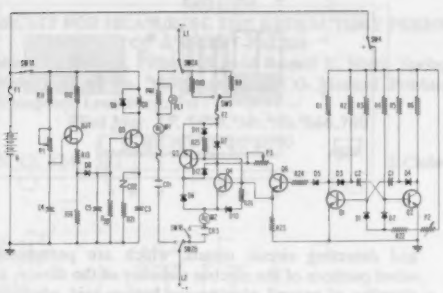
means for periodically enegizing said control winding so as to periodically drive said second core into saturation at a relatively rapid rate whereby said oppositely directed fluxes induced in said first core change at a relatively rapid rate thereby increasing the magnitude of said voltage induced in said secondary winding.

4,021,730

ELECTRICAL CONDUCTOR AND SHORT CIRCUIT LOCATOR

Paul E. Brinegar, 5904 SW. 21st., Lt. No. 17, Oklahoma City, Okla. 73128

Filed Feb. 21, 1975, Ser. No. 551,816
Int. Cl.² G01R 31/08
U.S. Cl. 324—52 4 Claims



1. An apparatus for locating electrical conductors and short circuits in DC circuits comprising:

first and second tests leads for connecting across fuse terminals or the like in a DC circuit to be tested wherein the fuse is blown by a short circuit or removed;

current limiting means for limiting the DC current in a circuit being tested to a predetermined value to prevent excessive current in a circuit having a short circuit; the predetermined value being sufficiently high such that the DC current when transformed into pulses is discernable at conducting points in the circuit by a clamp-on ammeter;

pulse generating means, connected in series with the current limiting means between the first and second test leads, for intermittently interrupting DC current in the circuit being tested; the frequency and amplitude of the pulses being in the range from 140to 1400 cycles per second so that a substantially steady current reading is visible on a clamp-on ammeter at all points along the circuit except at the short circuit; the pulse generating means comprising:

solid state switching means connected in series with the current limiting means between the first and second test leads for periodically interrupting the DC current in the circuit being tested; and

an adjustable frequency oscillator means connected to the solid state switching means to control the switching rate of the solid state switching means; the adjustable frequency oscillator being an a stable multivibrator and

the solid state switching means being polarity-insensitive and comprising:

a first transistor and a first diode, the first diode being connected in series with the collector-emitter circuit of the first transistor to provide a first polarity conduction path; and

a second transistor and a second diode, the second diode being connected in series with the collector-emitter circuit of the second transistor to provide a second polarity conduction path; the first transistor and first diode being connected in parallel with the second transistor and second diode; the base of the first and second transistors being connected to the output of the a stable multivibrator.

4,021,731

WAVEGUIDE FAULT LOCATION SYSTEM

Dietrich Anselm Alsberg, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 16, 1976, Ser. No. 667,259
Int. Cl.² G01R 31/11
U.S. Cl. 324—52 11 Claims

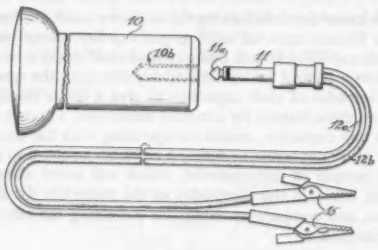
8. Apparatus for measuring the transmission loss characteristic of a waveguide comprising means for transmitting a test signal through said waveguide, movable reflecting means interior to said waveguide for reflecting a portion of said test signal, said movable reflecting means transmitting therethrough substantially all the energy of signals transmitted on said waveguide, means for propelling said movable reflecting means within said waveguide, and means for measuring the portions reflected as said movable reflecting means is propelled within said waveguide.

4,021,732

CONVERTIBLE ELECTRIC TESTER FOR USE WITH A FLASHLIGHT AND INCLUDING A JACK PLUG WITH TUBULAR SHUNT

John W. Metcalf, 2728 Emmaus Ave., Zion, Ill. 60099

Filed May 27, 1975, Ser. No. 581,274
Int. Cl.² G01R 31/02, 1/06; H01R 31/08
U.S. Cl. 324—53 1 Claim



1. Shunt means for a circuit tester comprising a pair of flexible, electrically conductive probes with an input terminal on one end of each probe and a single jack plug having two conductors arranged therein in an electrically insulated relationship to provide two spaced output terminals on one end portion of said jack plug, the other end of each probe being inserted into the other end portion of said jack plug with one of said probe other ends being connected to one of said conductors and the other end of the other probe being connected to the other of said conductors; said shunt means comprising a tubular element of the electrically conductive material to slidably receive and retain in frictional engagement at least the end portion of said jack plug having said output terminals, said tubular element being longitudinally split, one end of said tubular element being crimped inwardly to provide a stop for the terminal output end portion of said jack plug when inserted therein with one of said output terminals in contact with said element, said stop being in contact with the other of said terminal outputs to thereby provide a closed circuit between said output terminals, and a detent formed on an edge of said longitudinal split adjacent said crimped end to receive a notched depression in the terminal output end of said jack plug to retain said jack plug within said tubular element, being a non-conductive covering for said tubular element including

enclosing of the crimped end of said element, said jack plug being of a type insertable into a flash light having a switch activated, battery-operated circuit connected to a receptacle to receive said jack plug.

4,021,733

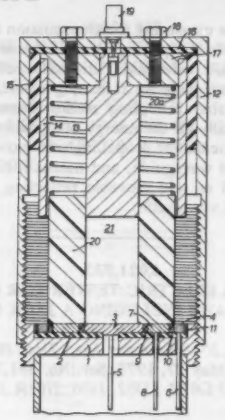
MOISTURE METERS

Brian John Green, Purton, and Bernard Ivor Lees-Smith, Hankerton, both of England, assignors to Probe Engineering Company Limited, England

Filed Sept. 29, 1975, Ser. No. 617,726

Int. Cl.² G01R 27/26

U.S. Cl. 324—61 R **9 Claims**



1. A meter for determining the moisture content of particulate or fibrous material, such as grain or hay, comprising two variable capacitors, each being symmetrical to a common axis, a common control for simultaneously changing the spacing of the electrodes of each capacitor to give a linear relationship between capacitances for constant dielectrics, a known dielectric in one capacitor, means co-operating with the electrodes of the other capacitor to define a chamber adapted to receive a test sample of said material, which will serve when compressed between the electrodes as the dielectric for that capacitor, and comparator means for indicating the ratio of the capacitances.

4,021,734

COULOMETRIC MEASURING INSTRUMENT WITH PLUG ADAPTERS FOR MAKING DIFFERENT MEASUREMENTS

Albert Ott, Sindelfingerstrasse 118, 7032 Sindelfingen 6, Germany

Filed Jan. 8, 1976, Ser. No. 647,652

Claims priority, application Germany, Jan. 30, 1975, 7502684[U]

Int. Cl.² G01R 27/22, 1/04

U.S. Cl. 324—94 **19 Claims**

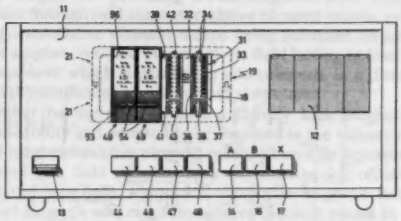
1. A device for the coulometric measurement of the thickness of thin metal layers of various materials on a base, including the following known parts: electro chemical cells in which the metal layer is used as one electrode for passing a d.c.-current through the cell under the action of which the layer is removed from the base, electrical circuit means for controlling the d.c.-current through the cell, electrical circuit means for detecting potential changes occuring at the electrodes of the cell at least when the current begins to remove the layer and when the layer is completely removed, and a time counter for measuring the time in which a certain current flows, which is stopped by the latter detected potential changes, comprising

electrical circuit means for the adaptation of the device to various measurement problems,

manually actuable switch means connecting said adaptation means to the electrical control and detecting means,

manually actuable switch means for electric connection of the cell used in the measurement problem to the electrical power supply and detecting means of the device,

a plurality of first plug means accessible to the outside of the device and electrically connected to said electric control



and detecting circuit means, which are permanently wired portions of the electric circuitry of the device, and

a plurality of second plug means having said adaptation means arranged thereon in the form of electrical circuit elements having values pertaining to separate measurement problems and carrying contact means electrically connected to said circuit elements and adapted to be selectively plugged into the first plug means and having shapes which facilitate the correct plugging into the first plug means.

4,021,735

METHOD AND APPARATUS FOR MAKING A METAL TO SEMICONDUCTOR CONTACT

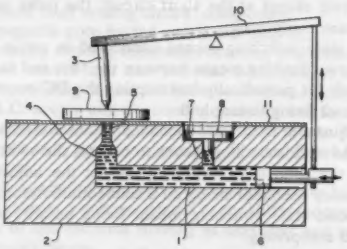
Fritz Vieweg-Gutberlet, Burghausen, Germany, and Peter Siegesleitner, Braunau, Austria, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik Grundstoffe mbH, Burghausen, Germany

Filed Oct. 22, 1975, Ser. No. 624,797

Claims priority, application Germany, Nov. 20, 1974, 2455040

Int. Cl.² G01R 1/06, 31/26, 27/26

U.S. Cl. 324—158 P **4 Claims**



2. A device for producing a reproducible, pressure and surface constant metal to semiconductor contact for voltage capacitance measurements on semiconductor samples with mercury as the metal component comprising

a housing containing a mercury electrode,

a rear contact mounted above the surface of said housing,

a pipe-shaped supply vessel for the mercury disposed in said housing and forming at one end thereof a contact tubule having /an outlet opening which discharges from said housing,

an expansion vessel connected to said supply vessel, and thereby to said contact tubule,

a balancing pistion movably disposed in said expansion vessel and closing said expansion vessel and-- has been added.

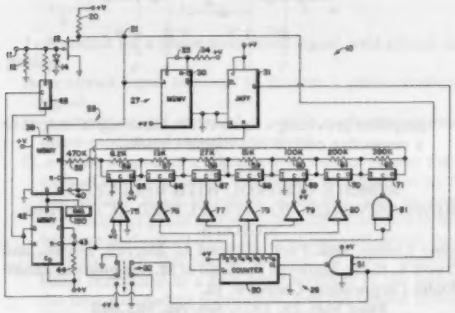
a movable pressure piston disposed in the other end of said supply vessel and closing said other end of said supply vessel in pressure communication with said contact tubule, thereby maintaining constant reproducible pressure.

4,021,736

CIRCUIT FOR MEASURING THE REFRACTORY PERIOD OF A HEART PACER

Robert A. Walters, Pittsburgh, and Russell E. Hirtz, Springdale, both of Pa., assignors to ARCO Medical Products Company, Leechburg, Pa.

Filed Mar. 15, 1976, Ser. No. 666,740
Int. Cl.² G04F 8/00
U.S. Cl. 324—181 2 Claims



1. A circuit for measuring the refractory period of a pacer comprising:

means for timing a time period in excess of the normal stimulation rate of the pacer initiated by each pacer produced stimulation pulse;

means triggered by the conclusion of each pacer stimulation pulse for producing a control pulse;

means for enlarging the width of said control pulse in an equal time step upon each sucessive occurrence of said pacer stimulation pulses;

means for applying a pulse of constant width to said pacer at the conclusion of said control pulse;

means for discontinuing the increase in said control pulse width upon the uninterrupted reaching of said time in excess of said stimulation pulse interval;

and means for monitoring the width of said increased pulse to indicate the refractory period of said pacer.

4,021,737

SYSTEM FOR PROCESSING AND TRANSMITTING AUDIO SIGNALS RECEIVED FROM A TELEVISION SET FOR REPRODUCTION BY A HIGH FIDELITY FM RECEIVER

Burdick S. Trask, 5043 Marietta Ave., Sherman Oaks, Calif. 19423

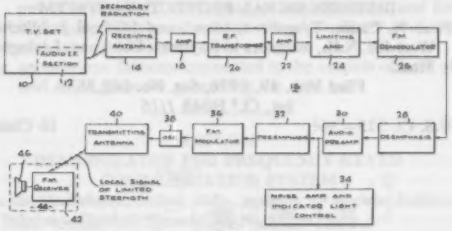
Filed June 4, 1975, Ser. No. 583,750
Int. Cl.² H04B 1/00
U.S. Cl. 325—36 4 Claims

1. An audio signal coupling and processing system comprising:

first antenna means for receiving signals of frequency within a defined narrow band to the exclusion of signals of frequency outside the defined narrow band, said first antenna means being operative to receive audio FM signals radiated from the IF section of a television receiver;

an FM demodulator coupled to the first antenna means for demodulating signals received by the first antenna means;

an FM modulator coupled to the FM demodulator and operative to frequency modulate signals demodulated by the FM demodulator about a carrier frequency within a commercial FM band, said FM modulator comprising a transistor having emitter, base and collector terminals, the base terminal being uncoupled from any source of potential, means coupling the emitter terminal to the FM demodulator, an oscillator having inductor means for determining the frequency of oscillation, means coupling



the collector terminal to one end of the inductor means, and means coupled between the emitter terminal and an opposite end of the inductor means for providing a voltage difference between the emitter terminal and the opposite end of the inductor means; and

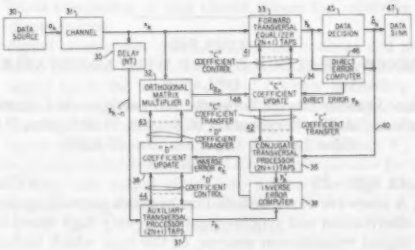
second antenna means coupled to the FM modulator and operative to transmit signals which are frequency modulated by the FM modulator for receipt by an FM receiver responsive to the commercial FM band.

4,021,738

ADAPTIVE EQUALIZER WITH FAST CONVERGENCE PROPERTIES

Richard Dennis Gitlin, and Francis Robert Magee, Jr., both of Monmouth Beach, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 1, 1976, Ser. No. 662,528
Int. Cl.² H04B 1/10
U.S. Cl. 325—323 6 Claims



1. In combination with a first forward transversal equalizer for a synchronous digital data receiver including a data detector from which a first tap-gain adjustment error signal is derived and a first set of variable tap-gain coefficient values are stored for such forward equalizer,

a conjugate transversal structure responsive to said first set of tap-gain coefficient values applied in inverse time order for operating an output data from said data detector,

a second forward transversal equalizer structure responsive to a second set of tap-gain coefficient values for operating on received digital data delayed by half the length of said first equalizer,

means responsive to a second tap-gain adjustment error signal derived from the difference between the respective outputs of said conjugate structure and said second forward equalizer structure for supplying said second set of

tap-gain coefficient values to said second forward transversal equalizer structure, and

means further responsive to said second set of tap-gain coefficient values for orthogonalizing sequences of received signals for updating said first set of variable tap-gain coefficient values.

4,021,739

DISTRESS SIGNAL PROTECTION SYSTEM

Peter N. Baum, Tyngsboro, Mass., and Michael J. Mitchell, Westville, N.H., assignors to Raytheon Company, Lexington, Mass.

Filed Mar. 19, 1976, Ser. No. 668,363
Int. Cl.² H04B *1/16*
U.S. Cl. 325—364 **10 Claims**

8. A radio frequency receiving system, comprising:

a. a first receiver section coupled to a receiving antenna and including means having a first time constant, for producing a first control signal to adjust the sensitivity of such receiver section in accordance with the level of received signals;

b. a second receiver section coupled to the first receiver section and including means for adjusting the sensitivity of such second receiver section in accordance with a control signal applied thereto, such adjusting means including means, having a time constant less than the first time constant, for producing a second control signal in accordance with the level of the signals coupled to such second receiver section, and means for enabling the first control signal to become applied as the control signal of such second receiver station when the level of the first control signal is greater than the level of the second control signal and for enabling the second control signal to become applied as the control signal for the second receiver section when the level of the second control signal is greater than the level of the first control signal.

4,021,740

SINEWAVE CLOCK DRIVER WITH ADJUSTABLE DELAY

Otakar Anthony Horna, Bethesda, Md., assignor to Communications Satellite Corporation (Comsat), Washington, D.C.

Filed Jan. 30, 1976, Ser. No. 653,868
Int. Cl.² H03K *5/08*
U.S. Cl. 328—29 **8 Claims**

1. A sinewave clock distribution network permitting simplified distribution and synchronization in very high speed logic and digital transmission systems of the type which include a plurality of digital circuits which are synchronized with clock pulse input signals, said network comprising:

a. a central sinewave clock generator for producing small amplitude clock signals,

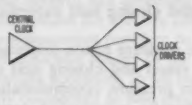
b. a plurality of clock drivers each of which is located in the vicinity of said digital circuits to which clock pulse input signals are to be supplied, and

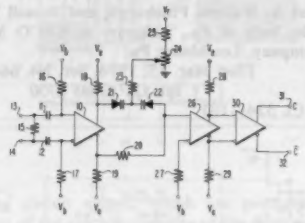
c. a low impedance transmission line branching network connecting the output of said clock generator to the inputs of said clock drivers, each of said clock drivers comprising:

i. a receiver amplifier having its input connected to said transmission line branching network,

ii. phase shift means connected to the output of said receiver amplifier for providing an adjustable phase delay in the output sinewave signal from said receiver amplifier, and

iii. a limiter amplifier connected to receive the phase delayed outut from said phase shift means, said limiter





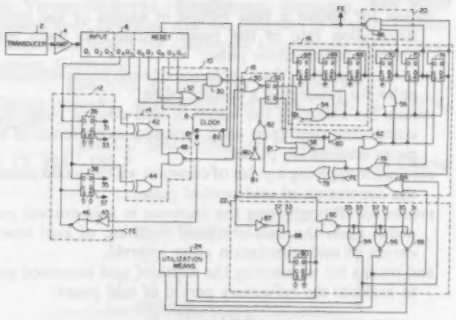
amplifier providing a squarewave clock signal output to a respective one of said digital circuits.

4,021,741

REMOTE CONTROL WITH REDUCED RESPONSIVENESS TO INTERRUPTED ACTUATING SIGNALS

Johnny Collins, Oak Park; Richard G. Merrell, Darien, and David A. Blass, Elmwood Park, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed May 29, 1975, Ser. No. 582,048
Int. Cl.² H03K *17/26*
U.S. Cl. 328—69 **9 Claims**



1. A digital circuit for selectively actuating a plurality of functions including an on-off function comprising:

receiving means for receiving actuating signals;

clock means;

generating means, coupled to said receiving means, for generating a control signal in response to reception of an actuating signal;

decoding means, coupled to said generating means and said receiving means, cooperating with said control signal for selectively actuating said functions at each occurrence of said control signal;

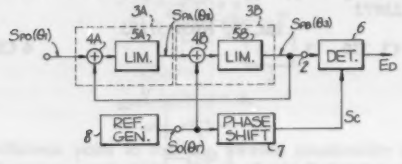
logic means, coupled to said generating means, for maintaining said control signal for a predetermined timing interval after actuation of said on-off function; and

counting means coupled between said logic means and said clock means and responsive to said clock means for establishing said predetermined timing interval.

4,021,742
PHASE COMPRESSOR FOR PHASE MODULATED SIGNAL

Yukihiko Machida, Mitaka, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 620,151, Oct. 6, 1975, abandoned.
This application Jan. 26, 1976, Ser. No. 652,613
Claims priority, application Japan, Oct. 7, 1974, 49-115316
Int. Cl.² H03D *3/02*
U.S. Cl. 329—50 5 Claims



1. A circuit for a phase-modulated signal, said circuit comprising:

A. a circuit input terminal to receive a phase-modulated signal;

B. a circuit output terminal at which a phase-compressed phase-modulated signal is obtained;

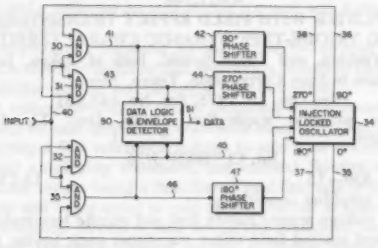
C. *n* phase suppressors, where *n* is an integer greater than 1, each of said suppressors comprising an adder having first and second input terminals, a limiter, and an output terminal, said phase suppressors being connected in series between said circuit input terminal and said circuit output terminal with the output terminal of each suppressor being connected to a first input terminal of the adder in the next succeeding suppressor, and the output terminal of the *n*th, (*n*−1)th, (*n*−2)th. . .2nd phase suppressors also being individually connected back to said second input terminals of the (*n*−1)th, (*n*−2)th, (*n*−3)th... 1st phase suppressors; and

D. a reference signal generator connected to the second input terminal of the adder of the *n*th phase suppressor, whereby the angular range of the phase-modulated signal at said circuit output terminal is phase-compressed by $1/_{(n+1)}$ compared to the angular range of said modulated signal at said circuit input terminal.

4,021,743
PHASE LOGIC DEMODULATOR

Dale H. Claxton, Hawthorne, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed June 1, 1976, Ser. No. 691,738
Int. Cl.² H03D *3/06*
U.S. Cl. 329—103 17 Claims



1. In a phase-shift keying, suppressed-carrier communication system, a phase logic demodulator comprising:

a. a first AND gate;

b. a second AND gate;

c. means for impressing a phase modulated signal simultaneously on both of said AND gates;

d. an injection locked oscillator having two outputs, one of which is 180° phase shifted with respect to the other;

e. means for impressing the output of said first AND gate on said oscillator and for impressing one of the outputs of said oscillator on said first AND gate;

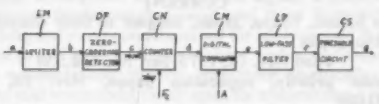
f. means including 180° phase shift for connecting the output of said second AND gate on said oscillator and for impressing the second output of said oscillator back on said second AND gate; and

g. an envelope detector connected to the outputs of both of said AND gates for generating the data.

4,021,744
DEMODULATOR FOR FREQUENCY-KEYED COMMUNICATION SYSTEM

Nicola Montefusco, Milan, Italy, assignor to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Mar. 17, 1976, Ser. No. 667,499
Claims priority, application Italy, Mar. 18, 1975, 21368/75
Int. Cl.² H03D *3/00;* H03K *9/06;* H04L *27/14*
U.S. Cl. 329—105 5 Claims



1. In a communication system having means for transmitting information by the alternation of a relatively high keying frequency F_A with a relatively low keying frequency F_B, a demodulator for said information comprising:

receiving means for an oscillation containing said keying frequencies;

circuit means for deriving *k* signal pulses per cycle from said oscillation, *k* being an integer;

a source of clock pulses of a cadence $F_c >> F_A$;

a pulse counter with a stepping input connected to said source for receiving said clock pulses and with a resetting input connected to said circuit means for receiving said signal pulses;

a digital comparator connected to said counter and preset to a selected reference number for emitting an output signal upon the reading of said counter exceeding said reference number, the latter being at least equal to the number of clock pulses occurring between successive signal pulses derived from said keying frequency F_A; and

integrating circuitry connected to said comparator for converting said output signal into a binary voltage varying with the frequency of said oscillation.

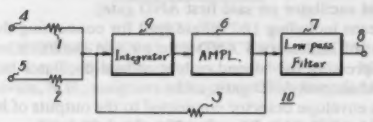
4,021,745
PULSE WIDTH MODULATED SIGNAL AMPLIFIER

Tadao Suzuki, and Tadao Yoshida, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 16, 1975, Ser. No. 641,244
Claims priority, application Japan, Dec. 18, 1974, 49-145470
Int. Cl.² H03F *3/38*
U.S. Cl. 330—10 6 Claims

1. A pulse width modulated signal amplifier comprising first and second input terminals for receiving a rectangular waveform signal as a carrier and a modulating signal, respectively; integrating means having an input and an output; summing means receiving said rectangular waveform signal and said modulating signal for supplying the sum of said rectangular waveform signal and said modulating signal to the input of said integrating means; high gaim amplifying means having an

input connected to said output of said integrating means and an output; a low pass filter connected to said output of the high gain amplifying means for producing a demodulated signal; an output terminal receiving said demodulated signal from said low pass filter; and a negative feedback circuit connected between said output of the high gain amplifying



means and said input of said integrating means to provide a negative feedback signal at said input of the integrating means which is substantially in phase with a signal provided at said output of the high gain amplifiying means and smaller than the rectangular waveform signal so that the modulation ratio of said rectangular waveform signal may be selected as high as 100 percent.

4,021,746

TRANSISTOR AMPLIFIER HAVING FIELD EFFECT TRANSISTORS WITH STABILIZED DRAIN BIAS CURRENT

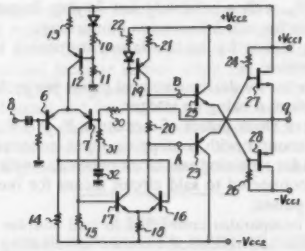
Tadao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 10, 1975, Ser. No. 630,330

Claims priority, application Japan, Nov. 15, 1974, 49-131686

Int. Cl.² H03F *3/16*

U.S. Cl. 330—13 **11 Claims**



1. A transistor amplifier comprising:

a first differential amplifier for receiving an input signal:

a second differential amplifier coupled to said first differential amplifier for receiving the signal amplified by said first differential amplifier;

an output stage comprised of a pair of complementary field effect transistors coupled to said second differential amplifier for receiving a bias voltage and the signal amplified by said second differential amplifier and for applying the amplified signal to an output terminal, each of said field effect transistors having triode-type dynamic characteristics and each field effect transistor having a particular amplification factor μ and a particular pinch-off voltage V_p, wherein $\mu \cdot V_p$ of each said field effect transistor is a constant k, each of said field effect transistors having a drain bias current subject to fluctuations when an operating voltage applied thereto changes;

means for supplying operating voltages to said first and second differential amplifiers and said output stage; and

means for injecting changes in the operating voltage supplied to at least said output stage into one of said differential amplifiers to correspondingly change said bias voltage applied to said field effect transistors in accordance with said operating voltage changes, whereby the bias currents in said field effect transistors are stabilized notwithstanding said operating voltage changes.

4,021,747

SIGNAL AMPLIFIER CIRCUIT USING A PAIR OF COMPLEMENTARY JUNCTION FIELD EFFECT TRANSISTORS

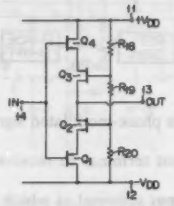
Shigeru Todokoro, Fujisawa, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 29, 1975, Ser. No. 617,571

Claims priority, application Japan, Oct. 29, 1974, 49-123972

Int. Cl.² H03F *3/185*

U.S. Cl. 330—13 **6 Claims**



1. A signal amplifier circuit comprising:

first and second junction field effect transistors of different channel types each having a drain electrode, source electrode and gate electrode;

third and fourth junction field effect transistors of different channel types each having a drain electrode, source electrode and gate electrode;

power supply means having first and second terminals;

output means for deriving an output signal;

means for serially coupling said first and second transistors in a source-to-source relationship between said output means and said first terminal of said power supply means;

means for serially coupling said third and fourth transistors in a source-to-source relationship between said output means and said second terminal of said power supply means and in such a manner that said second and third transistors are connected between said first and fourth transistors different in channel type from each other;

biasing means coupled between said first and second terminals of said power supply means to provide a potential between first and second potentials on said first and second terminals of said power supply means to the gate electrode of each of said second and third transistors; and

input means for applying an input signal to the gate electrodes of said first and fourth transistors.

4,021,748

AMPLIFIER WITH FIELD EFFECT TRANSISTORS HAVING TRIODE-TYPE DYNAMIC CHARACTERISTICS

Tadao Yoshida, and Tadao Suzuki, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 18, 1975, Ser. No. 641,981

Claims priority, application Japan, Dec. 23, 1974, 49-147885

Int. Cl.² H03F *3/26*

U.S. Cl. 330—15 **13 Claims**

8. An amplifier comprising:

a DC voltage source having first and second terminals;

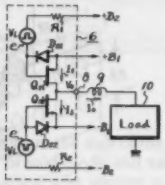
first and second field effect transistors each having gate, source and drain electrodes;

circuit means connecting the source and drain electrodes of said first and second field effect transistors in push-pull drain follower amplifying relation between said first and second terminals of the DC voltage source;

an output terminal connected to said circuit means between said first and second field effect transistors;

signal supplying means for supplying a signal to be amplified to said gate electrodes of said first and second field effect transistors; and

output circuit means including inductance means and a load connected in series between said output terminal and a



reference point so that the forward conductivity and thereverse conductivity of each of said first and second field effect transistors are substantially equal and substantially the same charging and discharging currents of said inductance means flow alternatively through said drain and source electrodes of each of said first and second field effect transistors when the respective transistor is in its conductive state.

4,021,749

SIGNAL AMPLIFYING CIRCUIT

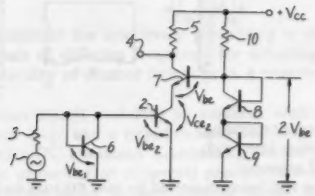
Yoshio Ishigaki, Tokyo; Masayuki Hongu, Komae, and Takashi Okada, Yamato, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 381,576, July 23, 1973, abandoned. This application Feb. 6, 1975, Ser. No. 547,583

Claims priority, application Japan, July 22, 1972, 47-73584; July 22, 1972, 47-73585; July 22, 1972, 47-73586

Int. Cl.² H03F 3/04

U.S. Cl. 330—22 **14 Claims**



1. A signal amplifying circuit, comprising: an amplifying transistor having a base electrode adapted to receive an input signal and a collector-emitter circuit through which an output current flows;

a compensating transistor having a collector-emitter circuit connected in series to said amplifying transistor collector-emitter circuit, and having a base electrode;

first reference voltage means including diode means coupled to said amplifying transistor base electrode for applying a first reference voltage to said base electrode of said amplifying transistor, the current flowing in said diode means being a function of said first reference voltage and being equal to said output current in said collector-emitter circuit of said amplifying transistor; and

second reference voltage means including plural diode means coupled to said compensating transistor base electrode for applying a second reference voltage to said base electrode of said compensating transistor thereby to apply a substantially constant predetermined voltage across said amplifying transistor collector-emitter circuit equal to said second reference voltage less the base-emitter voltage of said compensating transistor.

4,021,750

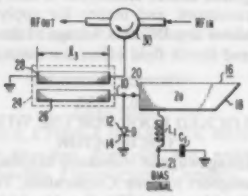
BROAD-BAND TRAPATT AMPLIFIER HAVING A TAPERED IDLER CIRCUIT

Panh-Ting Ho, Lawrenceville, and Arye Rosen, Cherry Hill, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,158

Int. Cl.² H03F 3/10

U.S. Cl. 330—34 **9 Claims**



1. A broad-band microwave apparatus of the type including a transmission line, a semiconductor element in said line for generating, in response to a threshold signal, a microwave signal having fundamental, second and third harmonically related frequency components means for applying said threshold signal to said semiconductor element, and output means to provide a substantially resistive impedance electrically connected to said semiconductor element for transmitting a signal component at a frequency corresponding to said second harmonic frequency to a terminating load impedance, wherein the improvement comprises:

an open-ended idler circuit connected in parallel with said semiconductor element,

said idler circuit comprising a distributed microstrip transmission line having a width which is a function of the length, and having sides of unequal length, said distributed transmission line having thereby a substantially linear taper across the open end of said idler circuit,

whereby said apparatus provides said microwave signal to said terminating load only at said second harmonic frequency.

4,021,751

FIELD EFFECT TRANSISTOR AMPLIFIER

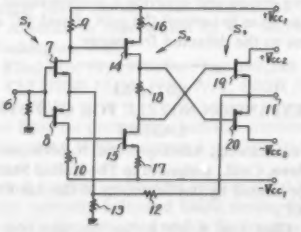
Tadao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 3, 1975, Ser. No. 628,147

Claims priority, application Japan, Nov. 15, 1974, 49-131685

Int. Cl.² H03F 3/16

U.S. Cl. 330—35 **13 Claims**



1. A field effect transistor amplifier comprising first DC voltage source means, first and second field effect transistors each having gate, source and drain electrodes, a resistor connected between the drain electrodes of said first and second

field effect transistors, means connecting the source electrodes of said first and second field effect transistors to said first DC voltage source means, input circuit means for applying to the gate electrodes of said first and second field effect transistors respective signals of the same polarity corresponding to an input signal to be amplified, second DC voltage source means, third and fourth field effect transistors each having gate, source and drain electrodes, the drain electrodes of said third and fourth field effect transistors being connected to said second DC voltage source means, the source electrodes of said third and fourth field effect transistors being connected to each other, an output terminal connected to the connected together source electrodes of said third and fourth field effect transistors, and means for applying the voltage across said resistor as a DC bias voltage to the gate electrodes of said third and fourth field effect transistors.

4,021,752
PHASE LOCKED LOOP FOR USE WITH LOCAL OSCILLATOR

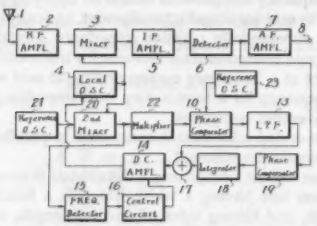
Teruo Sato, Kanagawa, and Nobuharu Michihata, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 11, 1976, Ser. No. 665,970

Claims priority, application Japan, Mar. 13, 1975, 50-30388

Int. Cl.² H03B 3/04

U.S. Cl. 331—17 **9 Claims**



1. A circuit comprising:

a. a local oscillator the frequency of which is changed within a predetermined frequency range;

b. a reference signal oscillator;

c. means for phase comparing output signals from said reference oscillator and said local oscillator;

d. a low pass filter supplied with the output signal from said phase comparing means;

e. a DC amplifier for receiving the output signal from said low pass filter and supplying its amplified DC signal to said local oscillator so as to phase-lock the local oscillator signal with said reference signal;

f. means for detecting the frequency of said local oscillator; and

g. control means for receiving the output signal from said detecting means and applying a control signal to said DC amplifier so as to control the gain of said DC amplifier in response to the detected frequency.

4,021,753
FREE EXPANSION NOZZLE FOR GAS DYNAMIC LASERS

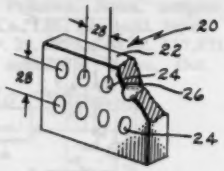
Ernie D. Braunschweig, Alburquerque, N. Mex., and Robert E. Wilson, Brea, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 8, 1975, Ser. No. 566,160

Int. Cl.² H01S 3/02

U.S. Cl. 331—94.5 D **9 Claims**

1. In a gas dynamic laser having at least one gas source providing a gas for said laser, a nozzle section and a resonant cavity the improvement therein being a free expansion nozzle mounted within said nozzle section, said free expansion nozzle comprising a nozzle member, said nozzle member having means located therein capable of elevating said gas flowing therethrough to a supersonic velocity, said means being in the form of a multitude of free expansion sites uniformly distributed within said nozzle section to effect a homogeneous gas flow in said resonant cavity, each of said sites being an opening in the range of 0.001–0.015 inches in size and spaced apart



a distance in the range of 0.005–0.15 inches between mid point thereof and where the ratio between the cross-sectional area of said nozzle section and the total cross-sectional area of said openings in said nozzle member is in the range of 25–100, whereby said gas, after passing through said free expansion nozzle and being elevated to a supersonic velocity thereby provides a medium capable of sustaining a lasing action within said resonant cavity.

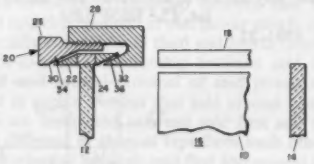
4,021,754
VARIABLE CURVATURE OPTICS FOR LASERS

Angelo A. Colao, Bedford, Mass., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Feb. 17, 1976, Ser. No. 658,218

Int. Cl.² H01S 3/086

U.S. Cl. 331—94.5 C **9 Claims**



1. A laser, comprising:

a crystalline laser rod;

a pair of mirrors;

said laser rod being bounded by said mirrors and in optical alignment therewith forming a laser cavity therebetween;

pumping means for pumping said laser rod; and

means associated with one of said pair of mirrors for providing an out-of-plane deformation of said mirror at least during the time of lasing action of the laser.

4,021,755
MICROWAVE OSCILLATOR HAVING NEGATIVE RESISTANCE DIODE INDUCTIVELY AND CAPACITIVELY MOUNTED IN WAVEGUIDE CAVITY

Stig Lennart Svensson, Akersberga, Sweden, assignor to Incentive AB, Stockholm, Sweden

Filed Sept. 5, 1975, Ser. No. 610,859

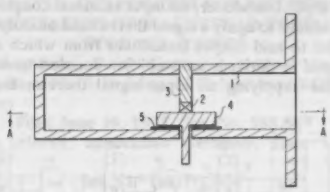
Claims priority, application Sweden, Sept. 9, 1974, 7411345

Int. Cl.² H03B 7/14

U.S. Cl. 331—96 **6 Claims**

1. A microwave oscillator comprising a shorted stub waveguide, a semiconductor diode having a negative differential resistance for the frequency used, and two electrically conductive elements protruding inwardly from opposite walls of the wave-guide at a predetermined distance from the closed

end of the wave-guide, said semiconductor diode being arranged between two opposite walls of the wave-guide and in electrical contact with said two elements, one of said elements



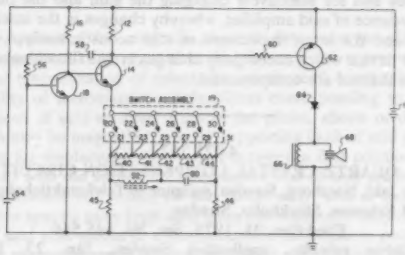
being electrically isolated from the wall of the wave-guide and rotatable about the axis of said diode and said two elements and also being unsymmetrical with respect to said axis.

4,021,756

ELECTRIC REMOTE CONTROL TRANSMITTER

Robert R. Podowski, Elmhurst, and Richard W. Citta, Oak Park, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed July 2, 1975, Ser. No. 592,582
Int. Cl.² H03B *5/20*
U.S. Cl. 331—117 R **7 Claims**



1. A transmitter for selectively generating a plurality of control signals of differing frequency for actuating a corresponding plurality of control functions in a remote receiver, comprising:

an oscillator circuit including an amplifier with a positive feedback loop, and a negative feedback loop having an AC and a DC frequency determining branch and being capable of oscillation at several predetermined frequencies corresponding to said control signal frequencies dependent upon the ratio of signal voltages applied to said branches; and

voltage dividing means coupled to said oscillator circuit and having a plurality of resistive elements for changing the ratio of said signal voltages applied to said branches.

4,021,757

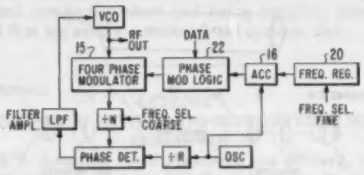
PHASE LOCK-LOOP MODULATOR USING AN ARITHMETIC SYNTHESIZER

Edward Joachim Nossen, Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 8, 1976, Ser. No. 675,080
Int. Cl.² H03C *3/00*
U.S. Cl. 332—19 **3 Claims**

1. In a phase lock loop including voltage-controlled oscillator means, phase detector means coupled to clock means, and low pass filter means for coupling an output signal from the phase detector means to control the frequency of an output signal from said voltage-controlled oscillator means, the improvement comprising:

phase modulator means coupling said output signal to said phase detector means for modulating and for translating the frequency of said voltage-controlled oscillator; and



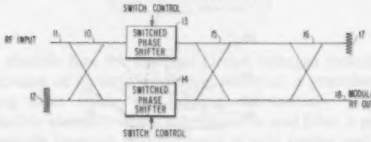
modulator control means for coupling a modulating signal to said modulator means.

4,021,758

DIRECT MODULATION 4 PHASE PSK MODULATOR

Arthur Frederick Standing, Rockville, Md., assignor to Communications Satellite Corporation (Comsat), Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,597
Int. Cl.² H04L *27/20*
U.S. Cl. 332—21 **5 Claims**



1. A 4 phase PSK modulator for directly modulating an RF carrier comprising:

first, second and third hybrids each having two input ports and two output ports, said first and second hybrids being 90° hybrids and said third hybrid being a 180° hybrid, one of the input ports of said first hybrid receiving the RF carrier and the other input port of said first hybrid being terminated in its characteristic impedance, the output ports of said second hybrid being directly connected to the input ports of said third hybrid, the modulated carrier being taken from either of the output ports of said third hybrid, and

first and second switched phase shifters connected between the output ports of said first hybrid and the input ports of said second hybrid, said first and second switched phase shifters each providing switched 0° or 180° phase shifts of incident RF energy.

4,021,759

EMP LINE FILTER USING MOV DEVICES

Morris Campi, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 19, 1976, Ser. No. 650,349
Int. Cl.² H03H *13/00, 7/10, 7/14;* **H02H** *3/22*
U.S. Cl. 333—70 R **10 Claims**

1. In a line filter for protecting electrical circuits from transient high frequency voltage surges, a configuration comprising:

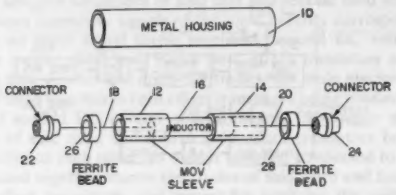
an elongated conductive housing with an axial bore;

at least one centrally hollowed MOV device fabricated in the form of a sleeve located within the housing and within electrical contact therewith;

at least one discrete inductor located within the MOV device, the inductor received axially with the sleeve; and

a plurality of connecting means located at opposite ends of the housing, the connecting means fabricated so as to

internally abut the MOV device, and electrically connected with the MOV device and the inductor for completing a filter configuration, the connector means also furnishing connection points to an electrical circuit to be protected.



4,021,760

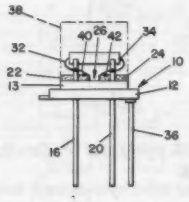
EMP CIRCUIT BOARD FILTER USING MOV DEVICES

Morris Campi, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 19, 1976, Ser. No. 650,350

Int. Cl.² 361 *119*; H03H *13/00*, *7/10*, *7/14*; H02H *3/27*

U.S. Cl. 333—70 R **5 Claims**



1. A filter for protecting circuits from over-voltage surges, the filter comprising:

supporting means for mounting filter components thereon wherein the supporting means includes a planar shoulder for mounting;

a plurality of MOV segments mounted on the planar shoulder, the segments positioned in spaced relation to each other to create respective capacitances for the filter;

at least one inductance mounted on the planar shoulder, adjacent the MOV segments;

electrodes attached to the supporting means and extending outwardly therefrom; and

means for connecting the MOV segments and the inductance to preselected electrodes for completing a filter configuration therebetween wherein the connecting means include two outwardly extending leads from the inductance to a first and second preselected electrodes and includes leads connecting each segment with a preselected electrode.

4,021,761

FILTER CIRCUIT HAVING AN ACOUSTIC SURFACE-WAVE FILTER DEVICE

Kokichi Morii, Chigasaki, and Ken-Ichi Urayama, Kamakura, both of Japan, assignors to Sony Corporation, Tokyo, Japan

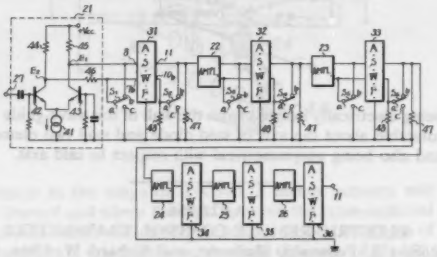
Filed Jan. 26, 1976, Ser. No. 652,615

Claims priority, application Japan, Jan. 30, 1975, 50-12738

Int. Cl.² H03H *9/04*, *9/26*, *9/32*; H03F *13/00*

U.S. Cl. 333—72 **18 Claims**

1. A filter circuit comprising: an acoustic surface-wave filter device having an input transducer comprised of a first set of interleaved electrodes formed of conductor elements and disposed on a first portion of a body of piezo-electric material adapted to propagate acoustic surface waves, an output transducer comprised of a second set of interleaved electrodes formed of conductor elements and disposed on a second portion of said body of piezo-electric material and spaced from said input transducer, an input terminal coupled to said input transducer to apply a signal thereto and an output terminal coupled to said output transducer from which a filtered output signal is derived; an amplifier coupled to said input terminal for supplying an input signal thereto; and means



coupled to said acoustic surface-wave filter device and to said amplifier for changing the number of conductor elements in at least one of said sets of interleaved electrodes for selectively changing the bandwidth of said acoustic surface-wave filter device and for selectively changing the gain and the output impedance of said amplifier, whereby changes in the insertion loss and the input impedance of said acoustic surface-wave filter device which accompany changes in said filter characteristics thereof are compensated.

4,021,762

QUARTZ CRYSTAL COMPENSATION CIRCUIT

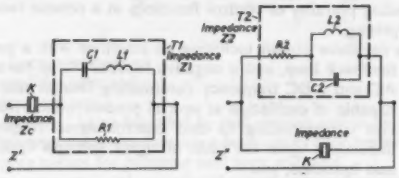
Ivan Jaki, Norsborg, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Dec. 31, 1975, Ser. No. 645,560

Claims priority, application Sweden, Jan. 23, 1975, 7500713

Int. Cl.² H03H *9/00*; H04R *17/10*

U.S. Cl. 333—72 **5 Claims**



1. A compensation network for a quartz crystal, said crystal having a plurality of resonance frequencies including a main resonance frequency and a plurality of secondary resonance frequencies, said network comprising

a two-terminal network having a resistive and a reactive part, and means for connecting said two-terminal network to said crystal to provide a two-terminal frequency determining circuit having a pair of access terminals, said reactive and resistive parts being dimensioned so that: (1) the reactive part of said two-terminal network is a resonant circuit having a resonance frequency equal to one of said plurality of resonance frequencies; (2) the impedance of the two-terminal frequency determining network is different from the impedance of said crystal at frequencies other than said one resonance frequency; and (3) the Q-value of the two-terminal frequency determining network at another of the resonance frequencies of said

plurality is at least 1.2 times smaller than the Q-values of said crystal at said one resonance frequency.

4,021,763

APPARATUS AND PROCESS FOR MULTIPOLAR MAGNETIZATION OF MAGNETIC INFORMATION STORAGE SHEETS

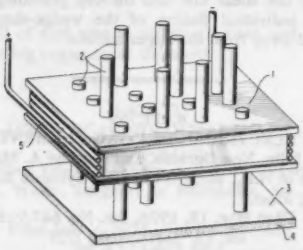
Erich Steingroever, Bonn, Germany, assignor to Elektro-Physik, Hans Nix & Dr. -Ing. E. Steingroever KG, Cologne, Germany

Filed June 10, 1975, Ser. No. 585,567

Claims priority, application Germany, June 12, 1974, 2428282

Int. Cl.² H01F *13/00*

U.S. Cl. 335—284 **15 Claims**



1. Apparatus for magnetization of data, storage plates, sheets or discs, of the type wherein information is represented by the magnetization of selected areas thereof, comprising a plurality of ferromagnetic pole pieces corresponding to the locations of said selected areas of the plates, sheets or discs which may be magnetized, means supporting each of said pole pieces for displaceable movement between a first position in contact with the surface of a respective one of said areas for magnetization of certain of said areas only, and a second position spaced away from said area, and means for subjecting all of said pole pieces to a magnetic field sufficient to permanently magnetize only the areas in contact with the pole pieces positioned in said first position and to avoid magnetization of the areas corresponding to the pole pieces in said second position.

4,021,764

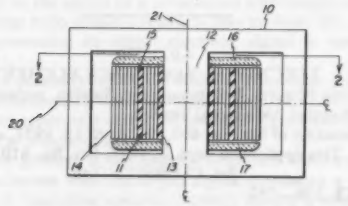
SHEET-WOUND TRANSFORMER COILS WITH REDUCED EDGE HEATING

Oliver H. Winn, Marlton, N.J., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,612

Int. Cl.² H01F *15/04*

U.S. Cl. 336—84 **11 Claims**



1. An electrical transformer comprising:

at least one conductive sheet overlaid by insulation;

a magnetic core, said conductive sheet being wound continuously in a plurality of turns about a first leg of said core; and

a magnetic disk situated closely adjacent at least one axial edge of said turns for carrying a large radial component of the magnetic flux leakage field established by current flow through said conductive sheet,

said core comprising a second leg radially outside the wound conductive sheet and being integrally joined to said first leg axially outside of said ceramic disk.

4,021,765

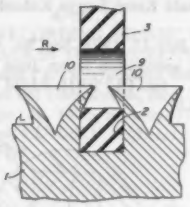
ELECTRIC FUSE WITH PLATE-SUPPORTED FUSIBLE ELEMENT

Frederick J. Kozacka, South Hampton, and Richard A. Belcher, Hampton Falls, both of N.H., assignors to Gould Inc., Electric Fuse Division, Newburyport, Mass.

Filed Jan. 6, 1976, Ser. No. 646,896

Int. Cl.² H01H *85/04*, *85/20*

U.S. Cl. 337—159 **4 Claims**



1. An electric fuse for elevated circuit voltages including a tubular casing of electric insulating material, a granular arc-quenching filler inside said casing, substantially helically wound fusible element means submersed in said filler, a pair of plug terminals inserted into the ends of said casing and conductively interconnected by said fusible element means, elongated plate means of electric insulating material having longitudinal edges supporting said fusible element means and having transverse edges engaging grooves provided in the axially inner end surfaces of said pair of plug terminals wherein the improvement comprises recesses in the lateral surfaces of said plate means arranged substantially at the levels of said axially inner end surfaces of said pair of plug terminals, and portions of the metal of which said pair of plug terminals consist displaced to project into said recesses and forming abutments positively precluding any significant movement of said plate means relative to said pair of plug terminals.

4,021,766

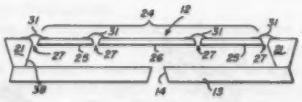
SOLID STATE PRESSURE TRANSDUCER OF THE LEAF SPRING TYPE AND BATCH METHOD OF MAKING SAME

Harry E. Aine, 1804 Stierlin Road, Mountain View, Calif. 94040

Filed July 28, 1975, Ser. No. 599,768

Int. Cl.² G01L *1/22*

U.S. Cl. 338—2 **21 Claims**



1. In a batch method for fabricating solid state pressure transducers, the steps of:

forming a batch of individual leaf spring structures connected to individual support structures in a wafer by recessing a batch of leaf spring patterns at selected locations through a first major face of said wafer to define said batch of leaf spring structures, individual ones of said leaf

spring structures being separated by intervening portions of said wafer for defining individual support structures joined to individual ones of said leaf spring structures for support thereof,

forming a batch of fluid tight partitioning structures each formed with a compliant portion for movement in accordance with a pressure differential applied thereacross;

sealing individual ones of said partitioning structures over individual ones of said spring structures in a fluid tight manner; and

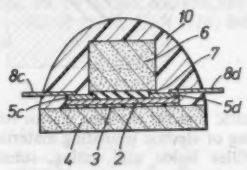
mechanically coupling individual ones of said compliant portions of said partitioning structures with individual ones of said spring structures for movement therewith.

4,021,767

HALL ELEMENT AND METHOD OF MANUFACTURING SAME

Kohei Nonaka, Tokyo, and Michio Sudo, Kuki, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed July 11, 1975, Ser. No. 594,974
Claims priority, application Japan, June 12, 1975, 50-71173
Int. Cl.² H01L *43/04*
U.S. Cl. 338—32 H **3 Claims**



1. A Hall element comprising:

an evaporated thin film of a semiconductor having a high mobility and having a thickness of 0.5 to 1.5μ, separated from an evaporation substrate after evaporation;

input electrodes and output electrodes formed on one surface of the evaporated thin film;

a first magnetizable member bonded to said one surface of the evaporated thin film by a layer of adhesive disposed between said first member and said one surface; and

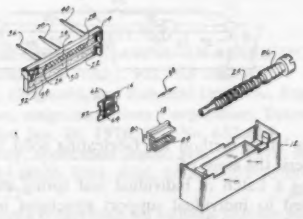
a second magnetizable member bonded to the other surface of the evaporated thin film by a layer of adhesive disposed between said second member and said other surface.

4,021,768

VARIABLE RESISTANCE CONTROL WITH MULTIPLE PADDLE CONTACTOR AND METHOD OF MAKING THE SAME

Ronald L. Stuckey, Monroe, Ind., assignor to CTS Corporation, Elkhart, Ind.

Filed Oct. 20, 1975, Ser. No. 623,985
Int. Cl.² H01C *10/42*; 29 *630 E*
U.S. Cl. 338—180 **15 Claims**



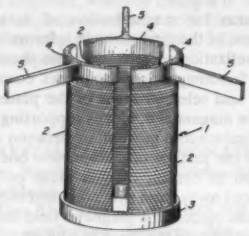
8. An electrical contactor for a variable resistance control comprising a piece of sheet metal having a planar portion including upper and lower surfaces, a first saw-tooth shaped shear line in the planar portion defining a plurality of adjacent and oppositely disposed wedge-shaped fingers, each of the fingers including both a narrow end and a pair of sides severed from the planar portion and from adjacent one of the fingers by the shear line, each of the fingers including a wide end integral with the planar portion and proximal to a narrow end of an adjacent one of the wedge-shaped fingers having an acute-angle upward bend proximal to the wide end thereof and a downward bend intermediate of the wide and narrow ends thereof, both bends being substantially orthogonal to a line bisecting the pair of sides thereof whereby the bends are effective to move each of the narrow ends distal from adjacent ones of the wide ends thereby effectively providing clearance between adjacent sides of the wedge-shaped fingers that are defined by the shear line and thereby providing clearance space for individual flexing of the wedge-shaped fingers toward and away from the upper surface.

4,021,769

ELECTRICAL HEATING ELEMENT

Ronald E. Edin, New Durham, and Norman A. Mathieu, Exeter, both of N.H., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Mar. 18, 1976, Ser. No. 667,915
Int. Cl.² H01C *3/14*, *7/22*
U.S. Cl. 338—299 **2 Claims**



1. An elongated electrical heating element comprising intertwisted helical strands of metal wire, the turns of one of said strands being held by the turns of an adjacent strand, some of said strands extending the full length of the heating element and others of said strands extending only a predetermined fraction of said full length, those strands extending only a predetermined fraction of said full length being scattered substantially uniformly throughout those strands extending the full length of the heating element, so as to provide at least two longitudinally extending regions of said heating element having differing resistances and therefore differing operating temperatures.

4,021,770

ELECTRICAL RESISTANCE ELEMENT

Venanzio Bizzarri, Hallstahammar, Sweden, assignor to Bulten-Kanthal Aktiebolag, Sweden

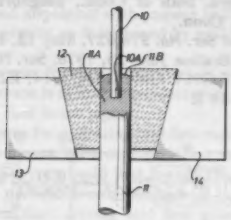
Continuation of Ser. No. 460,894, April 15, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 610,930
Int. Cl.² H01C *1/148*
U.S. Cl. 338—332 **2 Claims**

1. An electrical assembly, comprising:

a. an electrical resistance element comprising a small diameter wire consisting essentially of molybdenum dicilicide;

b. a cylindrical electrode having a connection with said wire and disposed in end-to-end relation therewith with their axes parallel, said electrode having a larger diameter between 1.5 and 3.0 mm and having higher conductivity than said wire; and

c. said connection comprising a solidified molten outermost end portion of only the electrode material surrounding



the end of said wire in tightly gripping and electrically conducting engagement therewith

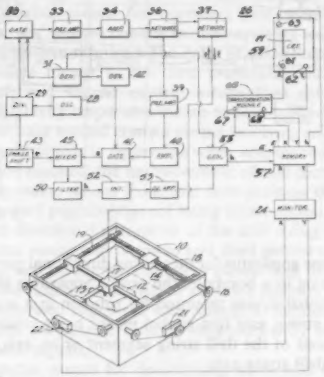
---

4,021,771

SCAN ACOUSTICAL HOLOGRAPHIC IMAGING APPARATUS

H. Dale Collins; Edwin M. Sheen, and R. Parks Gribble, all of Richland, Wash., assignors to Holosonics, Inc., Richland, Wash.

Filed July 7, 1975, Ser. No. 593,450
Int. Cl.² G01S 9/66
U.S. Cl. 340—5 H **5 Claims**



1. A scan acoustical holographic imaging apparatus for visually displaying an isometric image of an object in which the image depicts measurable surface countour information of the object, comprising:

an acoustical transducer for transmitting pulsed acoustical energy to the object of a preselected wavelength and for receiving echo pulsed acoustical energy from the object and generating an object electrical signal in response thereto;

means for scanning the object with the transducer by moving the transducer over the object in a coordinate X-Y plane to generate a multitude of object signals containing object profile information;

means for generating holographic reference electrical signals coherent with the object signal simulating a plane wave of irradiating acoustical energy having a reference plane and mixing the holographic reference signals with the multitude of object electrical signals to form resultant holographic object electrical signals containing profile and contour information of the object;

means responsive to the time interval between the transmission of the pulsed acoustical energy and receipt of the echo pulsed acoustical energy by the transducer for generating a Z coordinate electrical signal indicative of the distance of the object from the X-Y coordinate scan plane;

means responsive to the scanning means for generating X and Y coordinate electrical signals indicative of the position of the transducer as the object is being scanned;

means responsive to the X, Y, and Z coordinate electrical signals and the holographic object electrical signals for electronically generating an isometric projection of the object containing holographic surface contour information; and

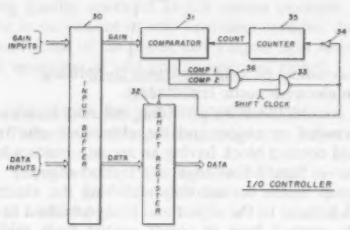
means responsive to the electronic projection for visually displaying an isometric image of the object to form profile and contour lines showing measurable changes in contour of the object relative to the reference plane, said changes being measurable in terms of the wavelength of the pulsed acoustical energy.

4,021,772

SYSTEM FOR RECORDING SEISMIC REFLECTION SIGNALS IN TRUE AMPLITUDE

Thomas W. Cook, and Carl A. Quaglino, both of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,231
Int. Cl.² G01V 1/28, 1/32
U.S. Cl. 340—15.5 DP **2 Claims**



1. A method of processing seismic reflection signals, comprising:

a. recording a plurality of seismic reflection signals in a plurality of recording channels,

b. amplifying the seismic reflection signals in each recording channel by a given number of units of amplification,

c. producing digital signals representative of the amplified seismic reflection signals iff each recording channel, each digital signal being represented by a plurality of data bits,

d. applying said digital signals from said recording channels to a plurality of shift registers,

e. producing a digital gain signal representing the number of units of amplification applied to the seismic reflection signals, said gain signal being represented by a plurality of gain bits,

f. generating clock pulses

g. comparing the digital number represented by said gain bits with said clock pulses to produce a first control signal when the cumulative number of said clock pulses produced is less than the digital number represented by said gain bits and a second control signal when the cumulative number of said clock pulses produced equals the digital number represented by said gain bits,

h. applying said clock pulses to said plurality of shift registers to shift the digital signals along said shift registers in response to said first control signal, and

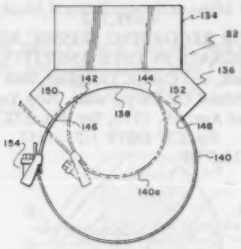
i. terminating the application of said clock pulses to said shift registers in response to said second control signal, whereby the position of the digital signals in said shift registers is representative of the amplitudes of the seismic

reflection signals prior to amplification in said recording channels.

4,021,773
ACOUSTICAL PICK-UP FOR RECEPTION OF SIGNALS FROM A DRILL PIPE

Bernard J. Keenan, West Chester, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Oct. 29, 1974, Ser. No. 518,922
Int. Cl.² G01V 1/40
U.S. Cl. 340—18 LD 12 Claims



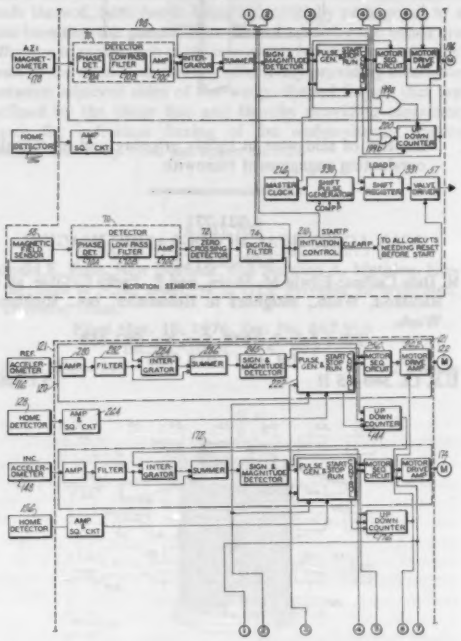
1. Acoustical pick-up apparatus comprising:
a. an electroacoustic transducer;
b. a contact block for providing efficient acoustic coupling between an object and the electroacoustic transducer, said contact block having an arcuate contact base which curves from a first edge to a second edge;
c. strap means for securely attaching the electroacoustic transducer to the object and being attached to said arcuate contact base at points spaced from said first and second edges, whereby the attachment of said strap means to points spaced from said first and second edges results in an arrangement wherein the contact block may be efficiently acoustically coupled to many different sized objects while minimizing the length of strap not in intimate contact with the object which is thereby free to vibrate and generate undesirable resonance.

7. An acoustic signaling system in a borehole drilling apparatus and comprising:
a. a drill pipe in the borehole;
b. acoustic signal generating means in the borehole;
c. means for coupling the generated acoustic signal into the drill pipe;
d. acoustic signal pick-up means mounted on a cylindrically shaped part of the drilling apparatus and including an electroacoustic transducer, and means for coupling the electroacoustic transducer to the cylindrically shaped part to provide an efficient acoustic coupling therebetween and including a contact block having an arcuate contact base which curves from a first edge to a second edge and which is adapted to be placed against the cylindrically shaped part and strap means connected to the contact block on the contact base at points spaced from said first and second edges, said strap means extending around the cylindrically shaped part and tightly clamping the contact base against it, whereby the attachment of the strap means at points spaced from said first and second edges results in an arrangement wherein the contact block may be efficiently acoustically coupled to many different cylindrically shaped parts having different diameters while minimizing the length of the strap means which is free to vibrate and generate undesirable resonance.

4,021,774
BOREHOLE SENSOR

Einar Asmundsson, Middle Haddam, and Donald S. Grosso, West Hartford, both of Conn., assignors to Teleco Inc., Middletown, Conn.

Continuation of Ser. No. 576,627, May 12, 1975, abandoned.
This application June 23, 1976, Ser. No. 699,037
Int. Cl.² G01V 1/40; G01C 9/14; E21B 47/22
U.S. Cl. 340—18 R 112 Claims



1. Sensor apparatus for measuring directional parameters of a drill string in a borehole, the sensor apparatus including:
first gimbal means mounted for rotation in a segment of a drill string, said first gimbal means being rotatable about the axis of the drill string segment or an axis parallel to the drill string axis;
first gravity responsive means mounted on said first gimbal means for generating first alignment signals as a function of gravity forces on said first gravity responsive means, said first alignment signals varying as a function of the alignment of said first gravity responsive means with respect to the direction of the force of gravity;
second gimbal means mounted for rotation in said drill string segment, said second gimbal means being rotatable about an axis perpendicular to the axis of rotation of said first gimbal;
second gravity responsive means mounted on said second gimbal means for generating second alignment signals as a function of gravity forces on said second gravity responsive means, said second alignment signals varying as a function of the alignment of said second gravity responsive means with respect to the direction of the force of gravity;
third gimbal means mounted for rotation in said drill string segment, said third gimbal means being rotatable about an axis perpendicular to an axis perpendicular to the axis of rotation of said first gimbal;
magnetic responsive means mounted on said third gimbal means for generating third alignment signals as a function of magnetic field forces on said magnetic responsive means, said third alignment signals varying as a function of the alignment of said magnetic responsive means with

respect to the direction of the earth's magnetic field;

first motor means connected to said first gimbal means for driving said first gravity responsive means to a first predetermined position and then to a second position having a predetermined alignment with respect to the direction of the force of gravity as determined by said first alignment signals;

first detector means for determining when said first gravity responsive means is at its first predetermined position and generating a first home signal;

first control means for operating said first motor means, said first control means receiving said first home signal to terminate the drive of said first gravity responsive means to the first predetermined position thereof, said first control means then driving said first gravity responsive means to said second position thereof, said first control means receiving said first alignment signals to determine when said second position has been reached, the net movement of said first gravity responsive means from said first position thereof to said second position thereof being commensurate with a first directional parameter of the drill string;

second motor means connected to said second gimbal means for driving said second gravity responsive means to a first predetermined position and then to a second position having a predetermined alignment with respect to the direction of the force of gravity as determined by said second alignment signals;

second detector means for determining when said second gravity responsive means is at its first predetermined position and generating a second home signal;

second control means for operating said second motor means, said second control means receiving said second home signal to terminate the drive of said second gravity responsive means to the first predetermined position thereof, said second control means then driving said second gravity responsive means to said second position thereof, said second control means receiving said second alignment signals to determine when said second position has been reached, the net movement of said second gravity responsive means from said first position thereof to said second position thereof being commensurate with a second directional parameter of the drill string;

third motor means connected to said third gimbal means for driving said magnetic responsive means to a first predetermined position and then to a second position having a predetermined alignment with respect to the direction of the earth's magnetic field as determined by said third alignment signals;

third detector means for determining when said magnetic responsive means is at its first predetermined position and generating a third home signal; and

third control means for operating said third motor means, said third control means receiving said third home signal to terminate the drive of said magnetic responsive means to the first predetermined position thereof, said third control means then driving said first magnetic responsive means to said second position thereof, said third control means receiving said third alignment signals to determine when said second position has been reached, the net movement of said magnetic responsive means from said first position thereof to said second position thereof being commensurate with a third directional parameter of the drill string.

4,021,775

SIGNAL DEVICE INDICATING DRIVING STATUS OF A CAR

Shih-Chin Leu, No. 50-2, Fukien Lane, Tung Hsing Terrace, Changhua Hsien, Erh Lin, China /Taiwan

Filed Apr. 29, 1976, Ser. No. 681,470
Int. Cl.² B60Q *1/26*; H01H *35/02*, *3/14*
U.S. Cl. 340—71 **5 Claims**

1. A signal device for indicating the driving status of a motor vehicle comprising:

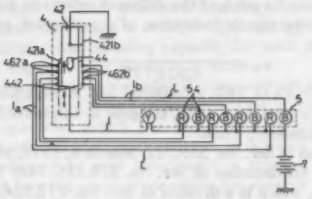
a pair of signal means affixed to said vehicle each having a plurality of different colored lights with the lights of different colors alternately positioned;

a spring biased accelerator pedal affixed to said vehicle;

an elongated switch operating member adapted for connection to said pedal and reciprocally movable in response to up and down movement thereof;

a switch casing mounted on said vehicle and receiving said operating member for reciprocal movement therein;

two cams disposed on opposite outside walls of said member and longitudinally offset from one another;



two rows of switches disposed in opposite inside walls of said casing each row of switches aligned with one of said cams and operable in response to a respective one of said cams to control the actuation of the signal lights of one color in sequence as said operating member moves in response to accelerating and decelerating travel of the pedal; and,

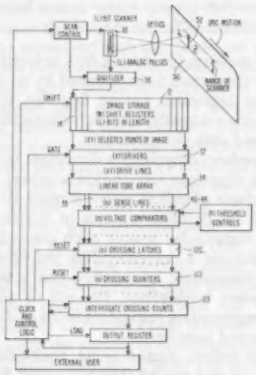
emergency signal means disposed in said member and including gravity operated switch means operable in response to movement of said operating member due to a sudden release of the pedal, and a signal light responsive to the operation of said gravity operated switch.

4,021,776

PATTERN RECOGNITION SYSTEM

Donald D. Tech, Chelmsford, Mass., assignor to Inforex, Inc., Burlington, Mass.

Filed Nov. 19, 1974, Ser. No. 525,067
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 MA **9 Claims**



1. A pattern recognition system, comprising:

means for scanning a region of a document W times for producing analog signals representing the relative darkness of areas of the document in said region;

digitizing means coupled to said means for scanning for digitizing said analog signals to produce a bit train of L digital signals for each of the W scans which digital signals represent whether discrete points of a scanned document are either light or dark;

register means coupled to said digitizing means for receiving and sequentially storing said trains of digital signals, said register means at any one time storing bit positions representing all W scans at sequential locations, the said trains

of digitial signals representing a pattern to be recognized;
sensing means coupled only to periodically spaced bit positions in said register means, said periodically spaced positions being occupied by digital signals from only periodically spaced, non-adjacent scans, said sensing means including
a plurality of magnetic cores, and
a plurality of drivers for effecting flux changes in ones of said cores, each of said cores being coupled to at least one driver; and
a group of sense lines coupled to said magnetic cores, one sense line for each of the different reference patterns for outputting signals indicative of a particular, recognized pattern.

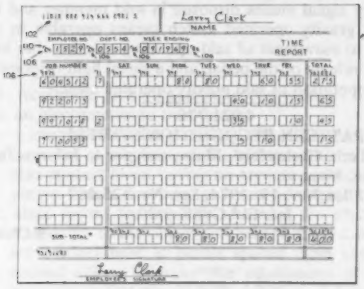
4,021,777
CHARACTER READING TECHNIQUES

David H. Shepard, Rye, N.Y., assignor to Cognitronics Corporation, Stamford, Conn.

Continuation of Ser. No. 555,722, March 6, 1975, abandoned, which is a continuation of Ser. No. 359,555, May 11, 1973, abandoned, which is a division of Ser. No. 172,924, Aug. 18, 1971, Pat. No. 3,820,067, which is a continuation of Ser. No. 876,694, Nov. 14, 1969, abandoned, and a continuation-in-part of Ser. No. 701,670, Jan. 30, 1968, Pat. No. 3,582,884. This application July 23, 1976, Ser. No. 708,068

Int. Cl.² G06K 9/00

U.S. Cl. 340—146.3 AH **2 Claims**



1. A record medium for storing data entered in the form of alphanumeric characters to be scanned by an optical character recognition apparatus having facilities to analyze scan signals to provide recognition of such characters and processing of the stored data comprising:
a record member comprising a document to be scanned by an optical character recognition scanner;
a plurality of sets of indicia means formed on said document with each set defining a series of horizontally-adjacent separate rectangular spaces each dimensioned to have entered therein a corresponding individual two-dimensional alphanumeric information character the shape of which carries intelligence, the sets of characters when entered representing respective fields of data to be stored in said record member;
said sets of indicia means being positioned in different locations on said record member yet all being located to be scanned by said optical character recognition scanner; and
a plurality of two-dimensional alphanumeric field code characters formed on said record member and having shapes carrying instructional intelligence, said field code characters being arranged in a series of separated locations each positionally related in a predetermined manner with respect to and closely adjacent the location of a respective one of said sets of indicia means;
said field code characters carrying said instructional intelligence embodied in the two-dimensional shapes thereof to permit recognition analysis thereof by the same facilities of said optical character recognition apparatus used to recognize said information characters;
said field code characters being provided with distinctive stylistic configurational characteristics embodied in the character format of at least certain of the field code characters and serving to permit said optical character recognition apparatus to distinguish the field code characters from said alphanumeric information characters, said field code characters, upon scanning and recognition by said optical character recognition apparatus, serving to provide to that apparatus instructional intelligence for directing the processing by that apparatus of the corresponding alphanumeric information characters.

4,021,778
PATTERN RECOGNITION SYSTEM

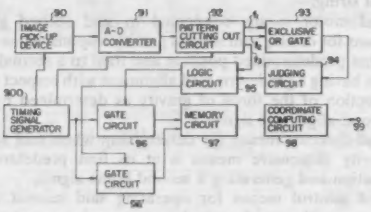
Hirotada Ueda; Takeshi Uno, both of Sayama, and Sadahiro Ikeda, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 2, 1976, Ser. No. 710,417

Claims priority, application Japan, Aug. 1, 1975, 50-93096

Int. Cl.² G06K 9/12

U.S. Cl. 340—146.3 AC **11 Claims**



1. A pattern recognition system for recognizing a specific pattern having at least first and second symmetrical portions from a binary representation of a subject pattern, comprising
first means for detecting those portions of binary signal representing the subject pattern which are located at the positions of said first and second symmetrical portions in the pattern to be recognized.
second means responsive to said first means for effecting an EXCLUSIVE OR operation between said detected pattern portions, and
third means responsive to the output of said second means for indicating whether the signal obtained from said second means designated recognition of said specific pattern.

4,021,779
MICROPROGRAM CONTROL UNITS

Peter Lycett Gardner, Tottlebank, England, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1975, Ser. No. 631,547

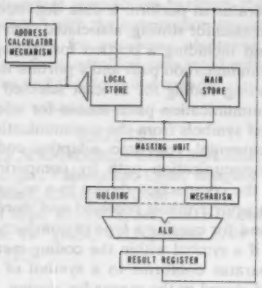
Claims priority, application United Kingdom, Nov. 27, 1974, 51369/74

Int. Cl.² G06F 9/16

U.S. Cl. 340—172.5 **5 Claims**

1. A microprogram control unit for controlling a system containing a processor, comprising
a microprogram store,
a plurality of microprogram auxiliary units, auxiliary selecting means connecting the auxiliary units to the microprogram store for selecting an auxiliary unit under control of the microprogram store to issue and process microinstruction signals contained in the auxiliary unit to thereby generate system control signals for a microprogram control interface to the system,
groups of processing elements organized by function in the system,
each auxiliary unit producing signals related to a particular group of processing elements and for initiating one or more other connecting auxiliary units to initiate the cycling of the connected auxiliary unit, and
means connecting the auxiliary units together in the micro-

program control unit and to an associated one of the groups of processing elements for interactively initiating



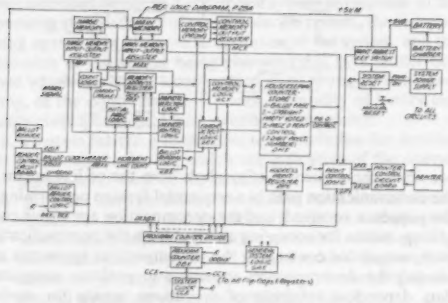
other auxiliary units for controlling the groups of processing elements.

4,021,780

BALLOT TALLYING SYSTEM INCLUDING A DIGITAL PROGRAMMABLE READ ONLY CONTROL MEMORY, A DIGITAL BALLOT IMAGE MEMORY AND A DIGITAL TOTALS MEMORY

James O. Narey, 14331 Purdy St., Westminster, Calif. 92683, and William H. Saylor, 31791 South Coast Highway, South Laguna, Calif. 92677

Filed Sept. 24, 1975, Ser. No. 616,328
Int. Cl.² G07C *13/00;* G06K *3/00;* G06F *7/12*
U.S. Cl. 340—172.5 **2 Claims**



1. A ballot reading and vote counting system comprising:

ballot feeding and mark sensing means which operates to move a ballot past a pair of optoelectronic reading heads one of which senses positional indexing marks another of which senses vote marks and each of which senses ballot identification code marks;

numeric printer means operating to imprint a paper tape containing a series of two number, typically each four digits in length the first of which uniquely identifies the total which is printed as the second number, these numbers commencing after a series of seven one-digit numerals, forming a precinct identification number;

digital programmable read only memory means which is erasable and electrically reprogrammable and which contains an instruction word, each represented by a plurality of bits, for each possible address of said digital programmable read only memory means and which thereby contains an instruction for each possible vote marking position on all ballot formats capable of interpretation by the system, one sub-portion of memory addresses, which may be termed page 0 of memory, causing precinct identification digits to be printed from said programmable read only memory means;

a further digital memory means which may be termed ballot image memory, for storing an image of all marks sensed as a ballot passes the mark sensing means and retaining the ballot mark image until those marks determined to be valid have caused the corresponding below-described main memory totals to be incremented;

a still further digital memory means which may be termed main memory, capable of incremental up-dating of totals as indicated by corrected ballot image memory marks, each main memory address containing a plurality of bits sufficient to encode a number representing the system's maximum vote counting capacity for each candidate or each response to a question or measure;

a functional interlocking circuit means which prevents the accepting and feeding of any ballot until such time as a key operated switch has been actuated which causes every address of main memory to be selected in sequence and cleared to zero whereupon a printout is initiated which lists the precinct identification number followed by the series of printout total identification numbers and the corresponding zero totals read out of memory, and which prevents the accepting and feeding of any ballot after such time as the key operated switch has been actuated a second time causing totals to be printed out, such printout constituting the closing of polls and such interlock preventing the undetected unauthorized reading of totals prior to the close of polls;

control means which causes the header portion of each ballot to preset the high order several bits of memory address (termed page number) and the low order several bits to start counting from zero for each index mark (clock mark) sensed (the low order group of bits termed line number) with overflow from a full line count causing the page number to increment and requiring no logical limitation to the number of lines contained on any single ballot and which causes each mark sensed on a ballot to be registered as a bit stored at the page and line address of said digital programmable read only memory means corresponding to the address count at which that mark is sensed;

further control means which causes the number of marks sensed within the boundaries of each office, question or issue to be compared with the maximum allowable number of votes permitted for one voter for that office, question or issue and a status bit recorded in the said digital programmable read only memory means wherever the permitted number of votes has been exceeded so that no marks from overvoted offices, questions or issues will be incremented into main memory totals but instead the fact of overvote will be incremented in the overvote storage memory address for that particular office, question or issue, and which will therefore cause all marks recorded in said digital programmable read only memory means without presence of the overvote status bit to be incremented at the corresponding main memory address;

second further control means which will verify that the defined number of header (page number) bits have been sensed prior to the sensing of coincident printed marks by each read head and that exactly the proper number of index (clock) marks have been sensed as programmed in the programmable read only memory means at the end of ballot and that at least one mark has been sensed by the mark reading head and will inhibit the updating of all memory totals except page zero line zero in the event that any of the foregoing verifications cannot be made and will activate an ink marker placing an identifying mark on the back of any ballot whose marks have not been included in the tally, page zero line zero storing the number of ballots fed but not read;

third further control means which will provide for a single vote mark on a ballot indicating the party choice of a voter causing every candidate of the chosen party on that

ballot to receive a count with further provision that if a vote is placed for a candidate of a party other than of the party choice, in that office only, the exception vote will be counted rather than the party vote; and

fourth further control means which will tabulate recall votes and candidates in accordance with recall laws which require a vote of YES or NO but not both on the recal question in order to enable counting of votes for replacement candidates marked on that ballot.

4,021,781

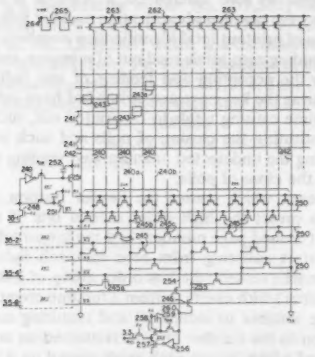
VIRTUAL GROUND READ-ONLY-MEMORY FOR ELECTRONIC CALCULATOR OR DIGITAL PROCESSOR

Edward R. Caudel, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 19, 1974, Ser. No. 525,238

Int. Cl.² G11C *17/00*

U.S. Cl. 340—172.5 **13 Claims**



1. In an electronic digital processor of the type implemented in large-scale-integrated semiconductor means, a read-only-memory for storing a large number of instructin words for defining the operation of the system, comprising: an array of rows and columns of memory cells having row and column lines and ground lines included in the array, a column of memory cells having a column line on each side thereof, the column lines being partitioned in groups, an output line being provided for each group of column lines, each group of column lines having access to only one ground line; column select means including a decode array receiving address signals for selecting a particular column in each group and connecting the column line on one side of the selected column to a ground line and connecting the column line on the other side of the selected column to an output line for such group, the decode array of the column select means consisting of less than 2N MOS transistors for each group, whose N is the number of column lines in a group; and means for precharging the column lines prior to connection of a selected column to a ground line and output line.

4,021,782

DATA COMPACTION SYSTEM AND APPARATUS

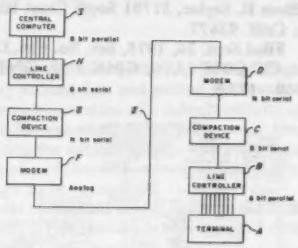
John S. Hoerning, 4741 Perry Ave., North, Minneapolis, Minn. 55429

Continuation-in-part of Ser. No. 431,066, Jan. 7, 1974, which is a continuation of Ser. No. 280,782, Aug. 15, 1972. This application Apr. 30, 1975, Ser. No. 573,571

Int. Cl.² G06F *5/00;* **H03K** *13/00*

U.S. Cl. 340—172.5 **37 Claims**

1. Data compaction apparatus for use on a path of communication of groups of symbols, comprising in combination: compaction apparatus inserted into the communication path at the transmission end and decompaction apparatus inserted into the communication path at the reception end for compacting data to be transmitted and decompacting data to be received, the compaction apparatus comprising: means for accepting an input from the communcation path; means for controlling the compaction apparatus and causing the compaction apparatus to perform a data dependent sequence of operations; means for storing, associated with the compaction apparatus and including a portion for storing selected data from the communication path and a portion for storing preset coding including coding for at least selected of the symbols from the communication path; means for selectively causing the storage of symbols from the communication path and for providing sequential, real time, adaptive coding of symbols from the communication path by comparing the symbols received by the compaction device in a sequential and serial fashion with prior symbols received and stored in the means for storing and for causing a type of compacted symbol to be transmitted if a symbol within the coding means of the compaction apparatus conforms to a symbol of a prior symbol received and stored in the means for storing, and for causing another type of compacted symbol to be transmitted if the symbol within the coding means of the compaction apparatus is not appropriately conforming to prior symbols received and stored in the means for storing but conforms to the preset coding within the means for storing, and for causing yet another type of compacted symbol to be transmitted if the symbol within the coding means of the compaction apparatus is not appropriately conforming to prior symbols received and stored in the means for storing and not appropriately conforming to preset coding within the means for storing; means for



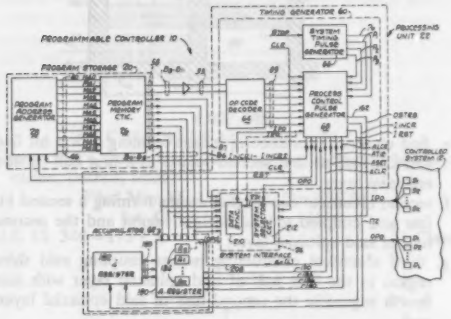
providing the sequences of symbols from the coding means to the communication path in a sequential fashion conforming to the sequence received; and the decompaction apparatus comprising: means for accepting an input from the communication path; means for controlling the decompaction apparatus and causing the decompaction apparatus to perform compacted data dependent sequence of operations; means for storing, associated with the decompaction apparatus and including a portion for storing selected data from the communication path and a portion for storing preset decoding including decoding for at least selected of the symbols from the communication path conforming to the selected symbols stored in the means for storing associated with the compaction apparatus; means for providing sequential, real time, adaptive decoding of symbols from the communication path by recognizing the first mentioned type of compacted symbols, the another type of compacted symbols, and the yet another type of compacted symbols, and for providing appropriate decoded symbols from the means for storing conforming to the particular symbols received; means for providing the decoded sequences of symbols from the decoding means to the communication path in a sequential fashion conforming to the sequence received; means for providing electrical connection between the means for storing associated with the compaction apparatus and the means for controlling associated with the compaction apparatus; means for providing electrical connection between the means for storing associated with the compaction apparatus and the coding means; means for providing electrical connection between the means for storing associated with the decom-

paction apparatus and the means for controlling associated with the decompaction apparatus; means for providing electrical connection between the means for storing associated with the decompaction apparatus and the decoding means; means for providing electrical connection between the means for controlling associated with the compaction apparatus and the coding means; means for providing electrical connection between the means for controlling associated with the decompaction apparatus and the decoding means.

4,021,783
PROGRAMMABLE CONTROLLER

Gary G. Highberger, Painesville, Ohio, assignor to Reliance Electric Company, Cleveland, Ohio

Filed Sept. 25, 1975, Ser. No. 616,860
Int. Cl.² G05C *19/24*; G06F *3/04*
U.S. Cl. 340—172.5 41 Claims



1. A sequence controller for selectively operating at least one controlled device in a controlled system in response to the operating status of a set of switches in the system, the switches being operated in response to operation of the system, and the operation of the system being characterized by a ladder diagram which represents a connection, in an *n*rung-by-*m* column array, of the controlled device with a plurality of binary elements corresponding to said switches, comprising:

a. a system interface responsive to the switches for deriving switch signals having which are indicative of the operating status of each of the switches;

b. program storage means responsive to a set of timing signals for storing and providing a sequence of program words which represents said connection of binary elements and controlled device in said ladder diagram, said sequence of program words thereby characterizing the desired operation of the controlled device;

c. data processing means for producing an output signal in response to the sequence of program words and to the switch signals for effecting operation of the selected controlled device, the data processing means including:

i. an accumulator having a plurality of at least *n*storage units individually conditionable in response to a set of processor signals, said storage units being effective to provide said output signal,

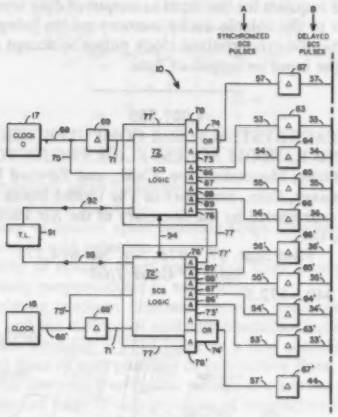
ii. process signal generating means responsive to the sequence of program words and to the switch signals for generating the set of processor signals and the set of timing signals, the processor signals representative of whether the values of the switch signals are indicative that the corresponding binary elements in the planar array would contribute towards operating said controlled device; and

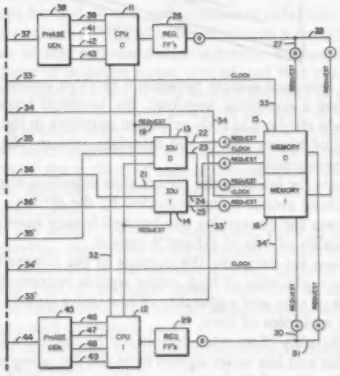
iii. timing means responsive to said set of timing signals for selecting the storage unit of said accumulator to be conditioned by said processor signals, whereby the selected storage unit after having been conditioned by the processor signals is indicative whether the binary element corresponding to said storage unit would contribute, as determined by the value of the corresponding switch signals, towards operating the controlled device.

4,021,784
CLOCK SYNCHRONIZATION SYSTEM

Joseph Anthony Kimlinger, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 12, 1976, Ser. No. 666,279
Int. Cl.² G06F *15/16*
U.S. Cl. 340—172.5 10 Claims





1. A fail soft synchronization clock system for a plurality of central processing units operably connected to remotely located volatile cache memory means, comprising:

a plurality of central processing units,

a clock in each central processing unit adapted to generate non-synchronized clock pulses of the same time duration,

a plurality of input-output units,

volatile cache memory means connected to said input-output units and to said central processing units for receiving generated requests from said units for the input or output of data in said memory,

synchronizing clock system logic means having inputs connected to the outputs of said clocks,

said synchronizing clock system logic means comprising control gating means for determining which central processing unit clock shall be connected to said central processing units, said input-output units and to said volatile cache memory means and for connecting the selected

central processing unit clock to said units and said memory means,

said synchronizing clock system logic means further including means for generating a plurality of timed outputs synchronized one with the other,

each of said plurality of timed outputs being connected by individual lines to one of said input-output units, said central processing units and to said volatile cache memory means, and

adjustable delay means in each of said individual lines for producing non-synchronized clock pulses, whereby said input-output units and said central processing units generate requests for the input or output of data immediately prior to the volatile cache memory means being enabled by the non-synchronized clock pulses to accept a request for the input or output of data.

4,021,785

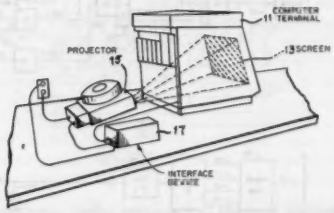
INTERFACE SYSTEM FOR A COMPUTER TERMINAL AND RANDOM ACCESS SLIDE PROJECTOR

Paul J. Kirby, Mountain View, Calif., and Edward M. Gardner, Denver, Colo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 17, 1975, Ser. No. 614,273

Int. Cl.² G06F *1/00*

U.S. Cl. 340—172.5 **4 Claims**



1. An interface system between a random access slide projector and a computer terminal, the terminal transmitting a data ready strobe and slide selection numbers in the form of a plurality of binary bits to the interface system, the interface system comprising:

a. means for latching the binary slide selection numbers, the latching means being activated by the strobe;

b. means for converting the latched binary numbers into a plurality of bits of a base 9 system;

c. means for decoding the outputs of the converting means into a plurality of high order signals representing multiples of nine and a plurality of low order signals representing multiples of nine;

d. a plurality of inverter drivers fed by one each of the high order and low order signals from the decoding means; and

e. a plurality of diodes connected to one each of the plurality of the inverter drivers.

4,021,786

MEMORY CELL CIRCUIT AND SEMICONDUCTOR STRUCTURE THEREFORE

Harry W. Peterson, Mountain View, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Oct. 30, 1975, Ser. No. 627,445

Int. Cl.² G11C *11/40*; H03K *5/00*, *3/26*; H01L *29/34*

U.S. Cl. 340—173 FF **18 Claims**

4. A semiconductor memory cell structure comprising:

a. a semiconductor substrate of a first conductivity type;

b. a buried layer formed in said substrate from semiconductor material of a second conductivity type to form a word line of said semiconductor memory cell;

c. an epitaxial layer formed over said buried layer from a semiconductor material of said first conductivity type, said epitaxial layer being partitioned into two halves by an isolation barrier;

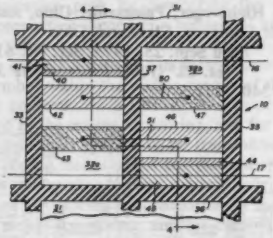
d. each half of said epitaxial layer comprising:

i. a first region of semiconductor material of said second conductivity type,

ii. a second region of semiconductor material of said first conductivity type,

iii. a third region of semiconductor material of said second conductivity type, and

iv. a fourth region of semiconductor material of said first conductivity type;



e. first electrical conducting means forming a first bit line and coupled to said second region in a first half of said epitaxial layer;

f. second electrical conducting means forming a second bit line and coupled to said second region and the second half of said epitaxial layer;

g. third electrical conducting means coupling said third region in the first half of said epitaxial layer with said fourth region in the second half of said epitaxial layer; and

h. fourth electrical conducting means coupling said fourth region in the first half of said epitaxial layer with said third region in the second half of said epitaxial layer.

4,021,787

INFORMATION STORAGE CIRCUIT EMPLOYING MNOS TRANSISTORS

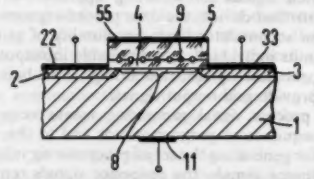
Karl-Ulrich Stein, Munich, and Karlheinrich Horninger, Gauting, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Division of Ser. No. 398,397, Sept. 18, 1973, abandoned. This application May 13, 1975, Ser. No. 576,989

Claims priority, application Germany, Sept. 18, 1972, 2245688

Int. Cl.² H01I *11/14*; G11C *11/40*

U.S. Cl. 340—173 R **6 Claims**



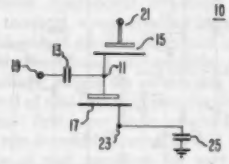
1. An electric circuit having MNOS transistors, said electric circuit comprising a storage matrix and decoders, each of said MNOS transistors comprising a gate electrode, a source electrode, and a drain electrode, a plurality of common gate lines each connected to the gate electrodes of a respective row of said matrix, a plurality of common source lines connected to the source electrodes of a respective column of said matrix, a plurality of common drain lines connected to the drain electrodes of a respective column of said matrix, each decoder connected to a respective one of said gate lines, and each of

said MNOS transistors comprising a single channel and a layered gate insulator, the MNOS transistor arranged on a substrate, and having a voltage which is variably dependent upon the electric charge stored in the gate insulator, said transistor comprising a channel length that is shorter than twice the depletion layer thickness during the recording and erasure of data, and adapted to receive, during the recording, readout and erasure of data only voltages of the same polarity at the gate, source and drain electrodes on the one hand and the common substrate on the other hand.

4,021,788
CAPACITOR MEMORY CELL

George Marr, Cupertino, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed May 16, 1975, Ser. No. 578,094
Int. Cl.² G11C *11/24, 11/34*
U.S. Cl. 340—173 CA 11 Claims



8. A dynamic capacitive memory cell for storage of binary valued information in the form of a high charge state or a low charge state written into a storage node and for readout from the storage node of the charge state stored therein comprising:

capacitive input means coupled to the storage node for accepting node readout pulses;

a MOS transistor having a first electrode at its gate electrode and having second and third electrodes, said gate electrode for receiving an enabling signal to place said MOS transistor in a conducting state, said second electrode being coupled to the storage node for transferring charge to the storage node in cooperation with said capacitive input means, and said third electrode for accepting a control signal having a value which controls the establishing of a said high charge state or a said low charge start at the storage node, said MOS transistor also cooperating with said capacitive input means for isolating the charge state stored at the storage node;

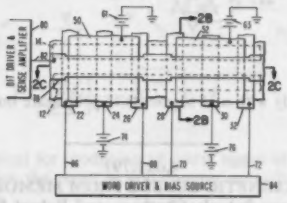
sensing means; and

capacitive readout means coupled to the storage node and to said sensing means, said capacitive readout means maintained at a high capacitance level or a low capacitance level responsive to the charge state isolated at the storage node for enabling operative coupling of said node readout pulses from said capacitive input means through said storage node and said capacitive readout means to said sensing means when said capacitive readout means is at said high capacitance level and for disabling operative coupling of said node readout pulses to said sensing means when said capacitive readout means is at said low capacitance level.

4,021,789
SELF-ALIGNED INTEGRATED CIRCUITS

Anatol Furman, Fairfax; Howard Leo Kalter, Colchester, and Johann Werner Nagel, Underhill, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,462
Int. Cl.² G11C *11/40;* H03K *3/38;* H01L *7/44, 29/34*
U.S. Cl. 340—173 R 25 Claims



20. A memory array comprising

a semiconductor substrate,

a plurality of spaced apart isolation strips disposeed at the surface of said substrate,

a plurality of spaced apart conductive lines arranged substantially perpendicular to said strips,

an insulating medium disposed between said conductive lines and the surface of said semiconductor substrate,

means for applying a word pulse to a first plurality of selected lines of said plurality of conductive lines,

means for applying a reference voltage to a second plurality of selected lines of said plurality of conductive line, one line of said second plurality of selected lines being disposed between adjacent pairs of lines of said first plurality of selected lines,

capacitors formed on said semiconductor substrate, each of said capacitors having as a first electrode a portion of the surface of said semiconductor substrate defined by adjacent pairs of isolation strips, one of said first plurality of selected lines and one of said second plurality of selected lines adjacent said one of said first plurality of selected lines, a second electrode of said capacitor being a conductive layer disposed on said insulating medium at said portion of the surface of said semiconductor substrate,

means for applying a fixed voltage to said conductive layer of said capacitor,

a plurality of current-carrying electrodes, each of said current-carrying electrodes being disposed in said semiconductor substrate at the surface thereof defined by said adjacent pair of isolation strips, said one of said first plurality of selected lines and an adjacent conductive line opposite said capacitor, and

means for connecting a bit line to each of said current-carrying electrodes.

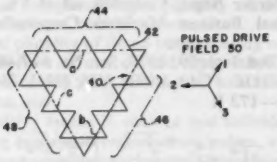
4,021,790
MUTUALLY EXCLUSIVE MAGNETIC BUBBLE PROPAGATION CIRCUITS

Howard H. Aiken, deceased, late of Fort Lauderdale, Fla. (by Mary E. Aiken, executrix); Paul T. Bailey, Creve Cour, Mo., and Robert C. Minnick, Houston, Tex., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 11, 1974, Ser. No. 432,450
Int. Cl.² G11C *19/08*
U.S. Cl. 340—174 TF 31 Claims

1. A field-accessed bubble propagation system, comprising a sheet of magnetic bubble material, means for applying a magnetic bias field orthogonal to said sheet to produce and maintain bubbles therein, a continuous ferromagnetic overlay pattern operatively disposed on said sheet including a continuously repeating pattern of three differently oriented linear segments joined end-to-end in the form of a truncated saw-

tooth pattern, and means for applying a sequence of pulsed drive field orientations in the plane of said sheet realigning



consecutively with said segments to propagate bubbles in one direction.

4,021,791

MAGNETIC BUBBLE PROM MEMORY

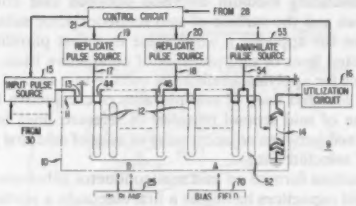
Andrew Henry Bobeck, Chatham, and Robert Frederick Fischer, Livingston, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 20, 1976, Ser. No. 678,628

Int. Cl.² G11C *11/14, 21/00*

U.S. Cl. 340—174 TF **7 Claims**

U.S. Patent May 3, 1977



1. A magnetic arrangement comprising a layer of material in which single wall domains can be moved, a pattern of elements coupled to said layer for defining a plurality of multistage closed loops for recirculating domains in said layer in response to a magnetic field reorienting in the plane of said layer, said elements also defining an accessing channel including a detector, said loops being organized into data and address sets, means for periodically moving to said accessing channel address information from first stages of said loops in said address set, and means responsive to the presence of preselected address information for moving the data in the associated stages of said data set into said accessing channel.

4,021,792

SMOKE ALARM

Roy R. Ludt, Alhambra; Carl A. Eggert, Canoga Park, and John Skarman, Whittier, all of Calif., assignors to Wellen Industries, Monterey Park, Calif.

Filed June 23, 1975, Ser. No. 589,420

Int. Cl.² G08B *17/10*

U.S. Cl. 340—237.5 **5 Claims**

1. A smoke alarm for detecting smoke in air comprising:

a light shielded smoke chamber defining a generally closed space having a longitudinal axis with a first and second port provided in said chamber at each end of said longitudinal axis, and having a third port disposed on an axis substantially perpendicular to said longitudinal axis, each of said ports having a baffling means for preventing the entry of light without substantially interfering with the entry of smoke through each of said ports into said chamber, at least one of said baffling means being a reticulated foam layer disposed across one of said ports, said reticulated layer having a nonporous plate disposed thereon whereby light is substantially prevented from penetrating said layer while smoke is permitted to enter said layer and aperture through the sides of said layer;

an array of louvered apertures proximately disposed to said third aperture, said array of apertures having louvers oriented with opposite inclinations whereby smoke flowing perpendicular to said longitudinal axis of said chamber is directed toward said third aperture regardless of direction of flow;

a flue means for directing smoke flowing parallel to said longitudinal axis of said chamber into said first and second ports;

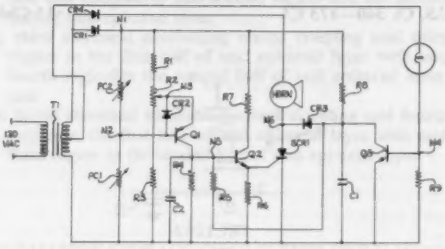
an incandescant bulb and lens assembly to provide a beam of collimated light said bulb thermally coupled to a heat sink at selected portions of said bulb whereby vaporized matter within said incandescant bulb is induced to condense on said selected portions of said bulb thermally coupled to said heat sink and light produced by said bulb and directed into said collimated beam is substantially unattenuated by condensation of said vaporized matter;

a first photoelectric cell to provide an electrical response upon the irradiation by light scattered from said collimated beam, said scattered light beam scattered by smoke dispersed into said chamber;

a second photoelectric cell to produce an electrical response upon the radiation by light from said beam;

a power supply to provide a source of electrical power;

a wheatstone bridge having four circuit segments coupled to



said power supply and grouped in a first and second series pair said first and second series pairs being coupled in parallel, said first series pair being said first and second photoelectric cell and said second series pair being low impedance electrical resistors, one of said resistors being a low impedance variable resistor, whereby said wheatstone bridge is substantially unaffected by changes in relative humidity;

an alarm means coupled to said wheatstone bridge for producing an alarm signal when said first photoelectric cell responds to a measured increase of light scattered from smoke within said chamber and for silencing said alarm signal when said first photoelectric cell responds to a measured decrease of light scattered from smoke within said chamber;

a relaxation oscillator coupled to said incandescant bulb, said relaxation oscillator being triggered when said incandescant bulb becomes open circuited, whereby a fail-safe signal is produced which is distinguishable from said alarm signal; and

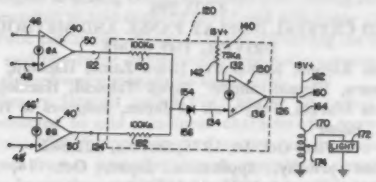
a coated wire having a predetermined optical scattering coefficient to simulate the scattering of light from smoke within said chamber, said wire removably disposed in said beam by a spring means and a shaft coupled to said wire, said shaft extending from said smoke alarm to allow manual depression to dispose said wire into said beam, said spring means for encouraging said wire from said beam when said shaft is not depressed.

4,021,793

DETECTOR DEVICE FOR CONVERTING A.C. INPUTS TO AN D.C. OUTPUT AND A SYSTEM FOR USING THE SAME

Frank W. Hill, Moline, Ill., and Theodore A. Hedman, Fort Collins, Colo., assignors to Gulf & Western Industries, Inc., New York, N.Y.

Division of Ser. No. 512,571, Oct. 7, 1974, Pat. No. 3,944,906.
This application Feb. 17, 1976, Ser. No. 658,671
Int. Cl.² G08B *21/00*
U.S. Cl. 340—248 A 3 Claims



1. A device for detecting the existence of concurrent A.C. inputs from at least one of each of two groups of A.C. inputs, said device comprising: first input lines each connected to one of the A.C. inputs of the first of said two groups of inputs; second input lines each connected to one of the A.C. inputs of the second of said two groups of inputs; a full wave rectifier connected to each of said input lines; each of said rectifiers having a first output conductive during the negative portion of an A.C. signal applied to the input line to which said rectifier is connected and a second output conductive during the positive portion of an A.C. signal applied to the input line to which said rectifier is connected; first and second NORTON type current responsive operational amplifiers each having an inverted input terminal, a non-inverted input terminal and an output terminal; means connected to said inverted terminals of said amplifiers for biasing said amplifier to produce a low level output voltage; means for connecting in parallel to the inverted terminal of said first amplifier the first outputs of said rectifiers for said first input lines; means for connecting in parallel to the non-inverted terminal of said first amplifier the second outputs of said rectifiers for said first input lines whereby said output terminal of said first amplifier will have a high level D.C. output voltage when an A.C. signal above a given value is applied to one of said first input lines; means for connecting in parallel to the inverted terminal of said second amplifier the first outputs of said rectifiers for said second input lines; means for connecting in parallel to the non-inverted terminal of said second amplifier said second outputs of said rectifiers for said second input lines whereby the output terminal of said second amplifier will have a high level D.C. output voltge when an A.C. signal above a given value is applied to one of said second input lines; and means responsive to a high level D.C. voltage on said first and second amplifiers for indicating the existence of concurrent A.C. signals on at least one of said first input lines and at least one of said second input lines.

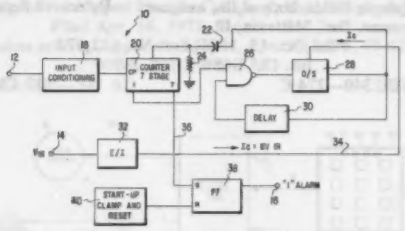
4,021,794

EXTERNAL CONDITION RESPONSIVE CIRCUIT PRODUCING ALARM WHEN FREQUENCY (ENGINE SPEED) TO AMPLITUDE SIGNAL (OIL PRESSURE) RATIO EXCEEDS THRESHOLD

Peter J. Carlson, Fort Lauderdale, Fla., assignor to Airpax Electronics Incorporated, Fort Lauderdale, Fla.

Filed Apr. 14, 1976, Ser. No. 676,873
Int. Cl.² G08B *21/00*
U.S. Cl. 340—248 R 20 Claims

1. A switching circuit comprising first and second input terminals for receiving respective digital and analog electrical input signals, an output terminal for deriving an alarm output signal from said circuit, a digital counter coupled to said first input terminal, an analog time delay coupled to said second input terminal, said analog time delay being coupled to said digital counter to modify the count of said counter in accordance with the magnitude of an electrical analog signal at said second input, and means coupling said digital counter to said



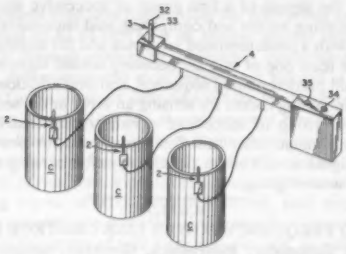
output terminal for producing an alarm signal at said output terminal when the count in said counter exceeds a predetermined value.

4,021,795

SYSTEM FOR INDICATING DEPLETION OF SLIVER FROM A SLIVER CAN

Robert Q. Hollingsworth, 1400 Ranier Falls Drive, Atlanta, Ga. 30329

Filed Aug. 4, 1975, Ser. No. 601,730
Int. Cl.² G08B *21/00;* H01R *13/62*
U.S. Cl. 340—272 3 Claims



1. A system for indicating a predetermined degree of depletion of sliver from any one of a plurality of sliver cans, said system comprising a source of energy, a plurality of individual indicating devices disjointably mounted respectively on said cans, each indicating device comprising support structure removably mounted on a sliver can and an indicator disposed on said support structure, each of said support structures including connector means arranged to engage connector means on each can and the connector means on each can constituting mounting means for disjointably engaging said support structure and the connector means on each support structure comprising biasing means for urging the connector means on the support structure into secure engagement with the connector means on the can, a plurality of sensing elements mounted respectively in said cans and arranged to sense a predetermined degree of depletion of sliver from the associated can, circuit means interconnecting said source of energy and said individual indicating devices and said sensing devices and controlled by each sensing device respectively to indicate a predetermined degree of depletion of sliver from the associated can, and a common indicating device interconnected with said sensing devices and respectively energized thereby for providing a system signal to indicate a predetermined degree of depletion of sliver in any one of said cans.

4,021,796

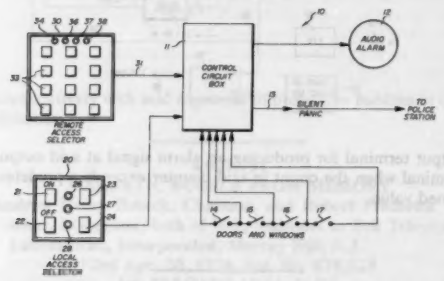
PUSHBUTTON PURMUTATION CODE CONTROL MEANS FOR A SECURITY ALARM SYSTEM

James M. Fawcett, Jr., Flossmoor, and Ronald G. Stillman, Olympia Fields, both of Ill., assignors to Detect-All Security Systems, Inc., Matteson, Ill.

Filed Oct. 15, 1975, Ser. No. 622,672

Int. Cl.² G08B *13/08, 29/00*

U.S. Cl. 340—274 C **13 Claims**



1. Activation means for a security system having an alarm circuit for allowing an authorized person selectively to enable and disable the alarm circuit, said activation means comprising; a plurality of individually and sequentially operable signalling means, circuit means connected with said signalling means and responsive to a plurality of signals in a predetermined sequence from said signalling means for enabling said alarm circuit when the alarm circuit is disabled and for disabling said alarm circuit when the alarm circuit is enabled, and additional circuit means coupled with said signalling means for successively sensing, upon actuation of said signalling means, the signals of a first group of successive signals from said signalling means and comparing said successively sensed signals with a predetermined sequence and for storing an error when at least one of said successively sensed signals deviates from said predetermined sequence, and said additional circuit means including means for sensing an error in the sequence of a second group of successive signals transmitted from said signalling means after said first group and for providing an alarm signal to said alarm circuit only after sensing said error in said second group.

4,021,797

AUDIO FREQUENCY POWER LINE CONTROL SYSTEM

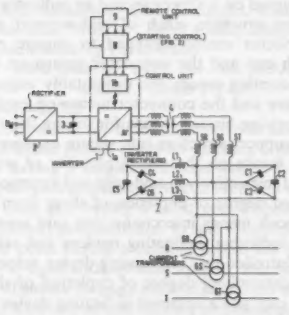
Helmut Hofmeister, Rottenbach, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 20, 1975, Ser. No. 633,794

Claims priority, application Germany, Nov. 28, 1974, 2456344

Int. Cl.² H04M *11/04*

U.S. Cl. 340—310 A **7 Claims**



1. A method of operating an audio frequency power line carrier control system which utilizes an inverter as the audio frequency power line carrier control transmitter with the output phase voltages of the transmitter fed to a distribution network through series inductances, filter circuits and current transformers, the inverter being controlled by a remote unit which generates audio frequency pulses and clock pulses, the audio frequency pulses being transmitted for the duration of each clock pulse, comprising modulating the audio frequency pulses at the beginning of a clock pulse with synchronized, pulse width modulated control pulses.

4,021,798

LIQUID CRYSTAL DISPLAY PANEL AND METHOD FOR DRIVING THE SAME

Hiroomi Kojima, Kamakura; Hideo Zama, Hachioji; Sadao Nomura, Higashi-yamato; Toyoji Tabuchi, Hachioji, and Ryozo Murata, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 14, 1975, Ser. No. 621,842

Claims priority, application Japan, Oct. 14, 1974, 49-117164; Oct. 14, 1974, 49-117163

Int. Cl.² G02F *1/13*

U.S. Cl. 340—324 M **8 Claims**

1. A liquid crystal display device comprising:

a plate of ferroelectric material;

a first group of electrodes disposed in a first direction on a first surface of said plate;

a second group of electrodes, disposed in a second direction, orthogonal to said first direction, on a second surface of said plate;

dielectric films disposed on said second group of electrodes;

intermediate electrodes, a principal portion of each of which is disposed on a respective dielectric film and another portion of each of which is disposed on a respective portion of the second surface of said plate adjacent a respective dielectric film and opposite an electrode of said first group of electrodes;

a transparent substrate positioned apart and facing the second surface of said plate;

a third group of electrodes disposed on the surface of said transparent substrate facing the second group of electrodes on the second surface of said plate in said second direction;

means for electrically connecting the respective electrodes of the second group of electrodes to those respective electrodes of the third group of electrodes facing each other; and

a liquid crystal medium interposed between said transparent substrate and said plate.

4,021,799

NON-LINEAR CODING SYSTEM

Shigehiko Hinoshita, Yokohama, and Yukihiko Minezima, Kawasaki, both of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Continuation of Ser. No. 142,833, May 11, 1971, abandoned. This application July 5, 1973, Ser. No. 376,808

Claims priority, application Japan, May 18, 1970, 45-42257

Int. Cl.² H03K *13/22*

U.S. Cl. 340—347 AD **3 Claims**

1. A non-linear coding system comprising a comparator means (8) and a local decoder means (19), said comparator means (8) comparing a sample magnitude signal with the reference magnitude signal out of said local decoder means (19) and codes the difference between said signals, said local decoder means (19) comprising:

a. a non-linear characteristic conrolling means (22), a lead (21) connecting an output of said comparator means (8) with an input of said non-linear characteristic controlling means 22, said non-linear characteristic controlling means (22) selecting a non-linear characteristic according to the forecast sample magnitude and characterizing the output of the comparator means (8) with the non-linear characteristic, said non-linear characteristic controlling means (22) having an output (27),

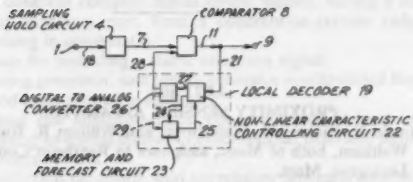
b. a digital to analog converter means (26) having an input connected to said output (27) of said non-linear characteristic controlling means (22) for converting the output of said non-linear characteristic controlling means (22) to the reference magnitude signal, and

c. memory forecast means (23) having an output (25) connected to said non-linear characteristic controlling means (22) for providing a forecast sample magnitude signal from a preceding sample magnitude signal, said non-linear characteristic controlling means (22) comprising:

a. first digital to digital converter means (41')

b. means connecting said first digital to digital converter means (41') to said forecast means (23) for converting the forecast sample magnitude signal in accordance with the conversion characteristic of a fundamental non-linear characteristic,

c. an output (45*a*, 45*b*, 45*c*, 45*d*),


SAMPLING HOLD CIRCUIT 4
COMPARATOR 8
DIGITAL TO ANALOG CONVERTER 26
LOCAL DECODER 19
NON-LINEAR CHARACTERISTIC CONTROLLING CIRCUIT 22
MEMORY AND FORECAST CIRCUIT 23

d. subtraction circuit means (33) connected to the output of said first digital to digital converter means (41') for producing difference signals indicating the difference between the output of the comparator means (8) and the output of the first digital to digital converter means (41') and providing an overflow signal when an overflow occurs in said subtraction circuit means (33),

e. first switch means (35*a*, 35*b*, 35*c*, 35*d*) supplied with the output of said comparator means (8) and the difference signals out of said subtraction circuit means (33) and controlled by said overflow signal,

f. second digital to digital converter means (41) connected to said first switch means (35*a*, 35*b*, 35*c*, 35*d*) for connecting an output of said first switch means (35*a*, 35*b*, 35*c*, 35*d*) in accordance with the fundamental non-linear characteristic, said second digital to digital converter means (41) having an output,

g. second switch means (44*a*, 44*b*, 44*c*) supplied with the forecast sample magnitude signal out of said forecast means (23) and controlled by said overflow signal, and

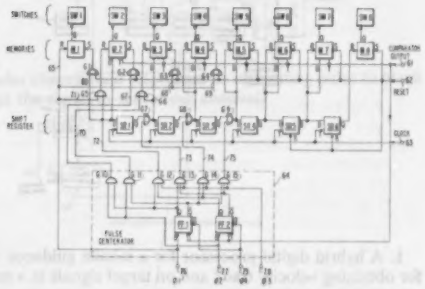
h. adder means (42) connected to the output of said second digital to digital converter means (41) and supplied with the forecast sample magnitude signal via said second switch means (44*a*, 44*b*, 44*c*) for adding said second output and the forecast sample magnitude signal.

4,021,800

NON-LINEAR CODER FOR PULSE CODE MODULATION OF TELEPHONE SIGNALS OR THE LIKE

Yoshio Katagiri, and Ryuichi Suda, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Apr. 16, 1975, Ser. No. 568,762
Claims priority, application Japan, Apr. 16, 1974, 49-42945
Int. Cl.[2] H03K *13/01*
U.S. Cl. 340—347 AD **1 Claim**



1. A segment-type non-linear coder for converting an input analog signal to an M-bit (M is an integer greater than two) binary code through pulse code modulation, comprising a first coder for determining the most siginificant bit and *n* subsequent bits (*n* is an integer including zof the feedback type for determining the (*n*+2)th and the subsequent bits of said binary code, having in its feedback loop switching circuits, a weighting circuit having a plurality of inputs and an output, the outputs of said switching circuits being connected to corresponding inputs of said weighting circuit, said weighting circuit for generating a decoded analog signal at its output in response to the states of said switching circuits, an adder for adding the output analog signal of said first coder to said decoded analog signal from said weighting circuit, a comparator for delivering a binary output code in response to the polarity of the output of said adder, and a logic circuit for converting said binary output code to control pulses for controlling said switching circuits, characterized in that said logic circuit comprises:

memory circuits commonly coupled to the output of said comparator and respectively coupled to said switching circuits;

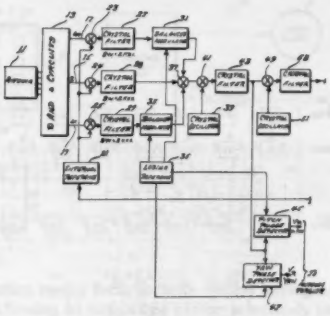
a shift register whose shifted pulse is in turn coupled to the data inputs of said memory circuits; and

a control pulse generator coupled to the output of said comparator for controlling said memory circuits and said shift register, said control pulse generator selecting a group of said switching circuits and a starting stage of said shift register by the (*n*+2)th through (*n*+*k*)th bits (*k* is an integer greater than 2, *n*+*k* <*M*) of said binary output code, the selected group of switching circuits operating, under control of a group of adjacent stages of said shift register starting from the selected stage thereof, as a group of switching circuits for a linear coder within a segment of the analog input versus digital output characteristics of said non-linear coder.

4,021,801
SINGLE BIT DOPPLER PROCESSOR FOR GUIDANCE MISSILE SYSTEM

Leon Chernick, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 3, 1971, Ser. No. 120,684
Int. Cl.² F41G 7/00; G01S 9/52
U.S. Cl. 343—5 DP 2 Claims



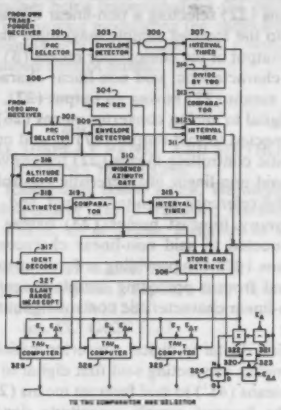
1. A hybrid digital processor for a missile guidance system for obtaining velocity track and on target signals in a continuous mode comprising:
a. a first mixer fed by an IF sum signal of the missile guidance system;
b. a local oscillator fed to the first mixer;
c. a limiter fed by the first mixer;
d. a clock pulsed sampler fed by the limiter;
e. a plurality of interconnected bipolar shift registers;
f. switching means for controlling the input, output, and recirculation of the shift registers;
g. a stepping voltage source;
h. a voltage controlled oscillator fed by the stepping voltage source;
i. a second mixer fed by the shift registers and the voltage controlled oscillator;
j. an envelope detector fed by the second mixer;
k. a threshold pulse generator fed by the envelope detector;
l. a bank of one bit counters; and
m. means for selecting one of the counters for pulsing, the selecting means being fed by the stepping voltage source and the threshold pulse generator with the outputs of the counters being velocity track and on target signals.

4,021,802
COLLISION AVOIDANCE SYSTEM

George B. Litchford, Northport, N.Y., assignor to Litchstreet Co., Northport, N.Y.

Filed July 29, 1975, Ser. No. 599,961
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 LC 20 Claims

1. A collision avoidance system including, at an Own station
a. means for receiving the interrogation messages transmitted by a selected SSR,
b. means for receiving reply messages transmitted by a transponder-equipped Other station in response to such interrogation messages,
c. means for identifying said Other station according to its reply messages,
d. means for identifying the SSR eliciting said reply messages according to the pulse repetition characteristics thereof,
e. means for determining from the time relationships between said received interrogation messages and said received reply messages, data as to the differential position of said identified Other station with respect to the Own station in at least the azimuth coordinates from said identified SSR,
f. means for determining respective TAU values from said differential position data,

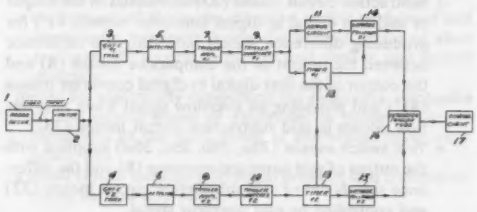


g. means for selecting the largest TAU value related to said identified Other station,
h. means for producing a threat warning signal in response to decrease of any such selected TAU value below a predetermined value.

4,021,803
PROXIMITY SENSING APPARATUS

Martin R. Richmond, Watertown, and William R. Hutchins, Waltham, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jan. 30, 1952, Ser. No. 268,976
Int. Cl.² F42C 13/04
U.S. Cl. 343—7 PF 15 Claims

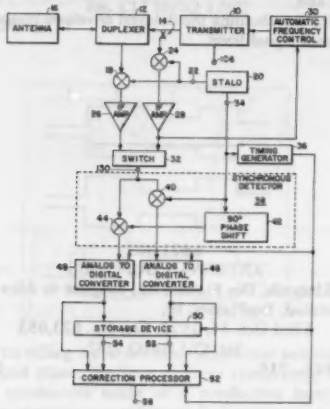


11. A proximity sensing system for energizing a detonation circuit in a missile carrying an explosive charge whenever said missile reaches a position relative to a target at which the full force of said charge may strike said target comprising a radar set installed in said missile to measure the relative speed between said missile and said target by means of changing doppler signals received thereby, a first means responsive to a first received doppler frequency for deriving an output indicative of a first time away of said missile from said position, and second means responsive to a second received doppler frequency occurring after and lower than said first received doppler frequency for deriving a second output indicative of a second time away of said missile from said position which is less than said first time away; and control means responsive to said first and second outputs for energizing said detonation circuit.

4,021,804
SYNCHRONIZED, COHERENT TIMING SYSTEM FOR COHERENT-ON-RECEIVE RADAR SYSTEM

Eric Alexander Dounce, Glendale, and Gregory Lee Westbrook, Tempe, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed July 7, 1975, Ser. No. 594,136
Int. Cl.² G01S 7/28
U.S. Cl. 343—17.1 R **2 Claims**



1. A synchronized reference signal system for providing phase coherent complex digital output signals, having a real and an imaginary part, from a coherent-on-receive radar, comprising in combination;

a stalo for providing a stable reference signal;

a timing generator, said timing generator synchronized from said stalo reference signal;

at least one analog-to-digital converter, said at least one analog-to-digital converter synchronized from said timing generator; and

a correction processor, said correlation processor synchronized from said timing generator,

said synchronizing providing phase coherence between said stalo, said timing generator, said at least one analog-to-digital converter and said correction processor.

4,021,805
SIDELOBE BLANKING SYSTEM

David D. Effinger, LaHabra, and Norol T. Evans, San Pedro, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 20, 1971, Ser. No. 210,256
Int. Cl.² G01S 7/28, 9/233
U.S. Cl. 343—17.2 PC **10 Claims**

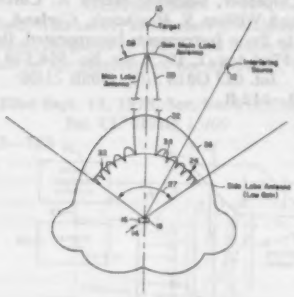
1. A sidelobe blanking system operable in a radar system receiving a coded pulse having a radar channel and a sidelobe channel each with amplitude limiting means and pulse compression means comprising:

first and second sampling means for sampling the coded pulse prior to said amplitude limiting means respectively in said radar channel and said sidelobe channel;

comparator means coupled to said first and second sampling means for generating a signal when the amplitude of the sampled signal in said sidelobe channel is larger than in said radar channel;

switching means responsive to the compression means in said sidelobe channel and the signal generated in said comparator means to develop a gating pulse; and

blanking means coupled to the compression means in said

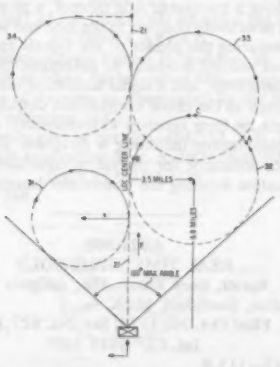


radar channel and responsive to said gating pulse to blank out the signal in said radar channel.

4,021,806
METHOD AND APPARATUS FOR GUIDING AIRCRAFT ALONG CURVED PATH APPROACH PROFILES

Robert P. Boriss, Holmdel, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 8, 1975, Ser. No. 638,238
Int. Cl.² G01S 1/16
U.S. Cl. 343—108 R **10 Claims**



10. A method of guiding an aircraft towards a landing site, comprising the steps of:

transmitting into a region of space a plurality of encoded radio beams which permit said aircraft to determine its azimuth, elevation and range to said landing site;

defining in said region of sapce at least one curved-path approach profile, said profile being tangent to the desired approach path for said landing site;

selecting in said aircraft the coordinates of said profile; and then

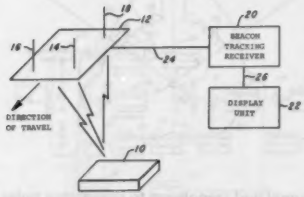
generating in said aircraft signals for said aircraft such that said aircraft is directed along said profile and onto said desired approach path.

4,021,807

BEACON TRACKING SYSTEM

Jerry W. Culpepper, Garland; Harry A. Currie, Farmers Branch, and William F. Heathcock, Garland, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 2, 1975, Ser. No. 564,510
Int. Cl.² G01S 5/02; G08B 21/00
U.S. Cl. 343—112 R 4 Claims



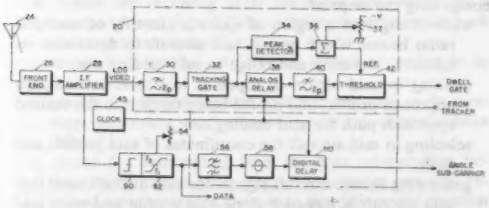
1. A single site beam tracking system comprising:
a. an article having a concealed compartment;
b. a miniature electromagnetic energy transmitter within the concealed compartment of the article, said transmitter including:
i. an oscillator having a frequency stabilizing means for providing a selected frequency stability;
ii. a frequency multiplier coupled to the oscillator for generating a higher harmonic of the oscillator frequency for signal discrimination in a noise environment;
iii. a switch; and
iv. a source of electrical power, said switch connected between the source of power and oscillator for controlling transmitter operation;
c. a storage means including a switch activator, said article stored within the storage means with the transmitter switch in operative association with the switch activator for maintaining the transmitter switch in an off position while the article is within the storage means;
d. a receiver means including first and second antennas mounted upon a vehicle in a selectively spaced relationship along a transverse axis thereof, a phase comparison circuit selectively coupled to the first and second antenna for comparing the phases of the signals received by said first and second antennas to determine the direction to said transmitter, and a signal amplitude measuring means connected to the phase comparison circuit for determining distance from receiver to transmitter; and
e. a display means including a direction indicator and a distance indicator for providing direction and distance information locating the transmitter bearing article.

4,021,808

REAL TIME THRESHOLD

Brendan J. Spratt, Boca Raton, Fla., assignor to The Bendix Corporation, Southfield, Mich.

Filed Oct. 30, 1975, Ser. No. 627,160
Int. Cl.² G01S 5/02
U.S. Cl. 343—113 R 5 Claims



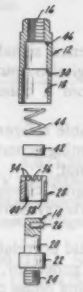
1. Means for detecting the envelope of a radiated beam scanning through space at a receiver illuminated by the beam wherein the receiver includes circuits for producing the envelope of said beam, comprising:
means for generating a signal at a signal level related to a predetermined point on said envelope and comprising a peak detector for detecting the peak level of said envelope and summing means decreasing the detected peak level by a predetermined amount to generate said signal level;
analog means for delaying said envelope a predetermined time; and,
means for thresholding the delayed envelope in accordance with said signal level.

4,021,809

ANTENNA COUPLINGS

John H. Klancnik, Des Plaines, Ill., assignor to Afco Products Incorporated, DesPlaines, Ill.

Filed Oct. 16, 1975, Ser. No. 623,053
Int. Cl.² H01Q 1/32
U.S. Cl. 343—715 10 Claims

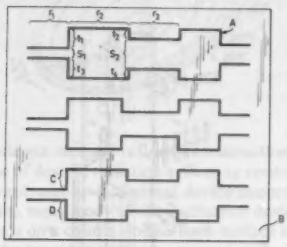


1. A coupling for a vehicle-mounted antenna for coupling the antenna to a mount attached to a part of the vehicle while permitting detachment of the antenna and comprising:
a shell member having an axially extending internal recess;
a stud member having a first portion disposed in said recess and a second portion extending axially thereof;
said members being relatively moveable, both axially and rotatably, and respectively having means carried thereby enabling the coupling to be attached to the base mount and enabling the antenna to be attached to the coupling;
one of said members having a lock pin fixed thereto;
the other of said members having an internal surface presenting a plurality of interconnected openings circumferentially spaced from one another for receiving the pin, each opening presenting a dead-end stop impermissive of axial separation of the members when the pin is disposed therein while yet permitting rotation and positioning of the pin in adjacent slots;
a spring means applying an axial force between said members tending to hold the pin disposed in an opening;
and said other member having an axially extending slot therein interconnected with and positioned between an adjacent pair of openings and at having a stop which, when the pin is aligned therewith, is permissive of the members being separated axially along with the antenna carried by one of the separated members, whereby knowledge of the location of the slot allows quick separation but lack of knowledge requires hunting for the slot.

4,021,810
TRAVELLING WAVE MEANDER CONDUCTOR ANTENNA

Seppo I. Urpo, Kalasaaksentie 3 B 22, Karakallio, Espoo; Henry Stefan Tallqvist, Lastenlinnantie 9 b C 15, Helsinki 25, and Martti E. Tiuri, Takojantie 1 F, Tapiola 3, Espoo, all of Finland

Filed Dec. 22, 1975, Ser. No. 642,827
Claims priority, application Finland, Dec. 31, 1974, 3797/74
Int. Cl.² H01Q *11/02*
U.S. Cl. 343—731 7 Claims

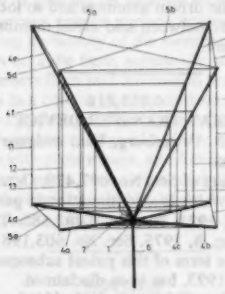


1. In a travelling wave meander conductor antenna including a ground plane, the improvement comprising: meander-structure conductors made of a conductive material, said conductors zigzagging as substantially forming open parallelograms and placed above a ground plane, which conductors alternately comprise first portions parallel with the longitudinal axis of the antenna and second portions substantially perpendicular to said longitudinal axis so that the number of conductors is even, said conductors being connected at their respective ends to an antenna feed point by means of electrically substantially equally long conductors.

4,021,811
QUAD ANTENNA SUPPORT

Erich Bastian, Lohrbergweg 20, 53 Bonn-Beuel, Germany

Filed Aug. 13, 1975, Ser. No. 604,184
Claims priority, application Germany, Aug. 19, 1975, 2439708
Int. Cl.² H01Q *7/02*
U.S. Cl. 343—742 4 Claims

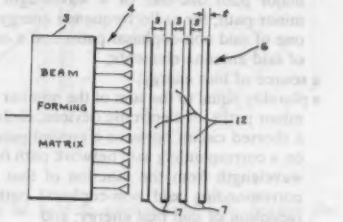


1. Quad antenna for short-wave or ultrashort-wave range, including VHF and UHF, comprising at least one radiating element and an associated reflector element disposed to form a cube, and element holder means including a plurality of element holders for retaining the radiating and reflector elements in their positions, said element holders being mounted to converge in a single mounting point located in the center of the base plane of the cube formed by the corner points of the radiating and reflector elements.

4,021,812
LAYERED DIELECTRIC FILTER FOR SIDELOBE SUPPRESSION

Allan C. Schell, Winchester, and Robert J. Mailloux, Wayland, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 11, 1975, Ser. No. 612,530
Int. Cl.² H01Q *15/00*
U.S. Cl. 343—753 3 Claims

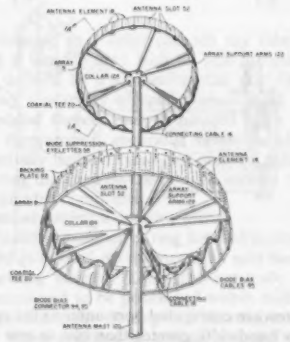


1. Directional beam forming means comprising
a phased array antenna having a multiplicity of radiating elements, and
a Chebyshev filter, said Chebyshev filter being disposed proximate to the radiating aperture of said radiating elements and in intercepting relationship with electromagnetic wave energy transmitted and received thereby, said Chebyshev filter comprising a plurality of discrete contiguous layers of dielectric substance, alternate layers thereof having high and low dielectric constants, said high dielectric constant layers being a quarter wavelength thick and spaced at integral half wavelength distances so as to effect substantially complete cancellation of beam energy reflected by said sheet members for a given beam direction.

4,021,813
GEOMETRICALLY DERIVED BEAM CIRCULAR ANTENNA ARRAY

Lawrence M. Black, Olney; Egbert H. Jackson, Jr., and Henry J. Bilow, both of Silver Spring, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 484,733, July 1, 1974, abandoned. This application Mar. 5, 1976, Ser. No. 664,347
Int. Cl.² H01Q *3/26*
U.S. Cl. 343—768 6 Claims



1. An antenna for scanning a spherical sector comprising:
a plurality in excess of 2N + 1 where N is an integer valve, of antenna elements oriented normal to said spherical

sector and spaced tangentially along an arc within said spherical sector;

a radio frequency device for processing a signal having a characteristic wavelength;

conductive means electrically coupled to said signal processing means for providing a plurality equal to the number of said antenna elements, of non-cophasal radio frequency paths differing in length by multiples of one said wavelength;

a plurality of networks equal in number to said antenna elements, each network providing a minor path and a major path one-half of a wavelength longer than the minor path, for radio frequency energy passing between one of said non-cophasal paths and a corresponding one of said antenna elements;

a source of bias energy;

a plurality equal to the sum of the number of said major and minor paths, of electronic devices, each device providing a shorted circuit between a ground potential and a point on a corresponding said network path one quarter of said wavelength from the junction of that network and the corresponding said non-cophasal path in response to reception of said bias energy; and

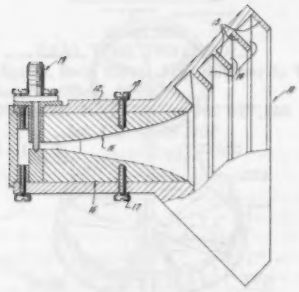
switching means for electrically coupling each of said electronic devices to said source of bias energy according to a selected sequence;

whereby said antenna scans said spherical sector in successive overlapping sectorates of that part of said sector having an arcuate width in conformance with said arc by sequentially exciting each stepped groups of $2N + 1$ said elements symmetrical about a normal bisecting the successive corresponding sectorates wherein for each sectorate all of said plurality of electronic devices except those electronic devices providing shorted circuits to the minor paths of those networks corresponding to the N adjoining said elements symmetric about said normal and those networks corresponding to those elements next adjoining but one from said N adjoining elements are coupled via said switching means to said source of bias energy.

4,021,814
BROADBAND CORRUGATED HORN WITH DOUBLE-RIDGED CIRCULAR WAVEGUIDE

John L. Kerr, Neptune, and Michael J. Timochko, Lanoka Harbor, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 19, 1976, Ser. No. 650,324
Int. Cl.² H01Q *13/02*
U.S. Cl. 343—786 **1 Claim**

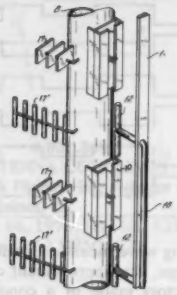


1. A microwave corrugated horn antenna for operating over a frequency bandwidth greater than two to one comprising a plurality of ridges each having a predetermined width and a plurality of gaps of predetermined width disposed therebetween, the width of said gaps exceeding the width of said ridges and the width of each said gap being substantially 0.38λ where λ is the wavelength at the upper end of the frequency band of operation and the depth of said gaps being less than one quarter wavelength at the lower end of the operating frequency band.

4,021,815
CIRCULARLY POLARIZED TRANSMITTING ANTENNA EMPLOYING END-FIRE ELEMENTS

Richard D. Bogner, 4 Hunters Lane, Roslyn, N.Y. 11576

Filed Mar. 22, 1976, Ser. No. 669,311
Int. Cl.² H01Q *21/24*
U.S. Cl. 343—727 **4 Claims**



1. An antenna assembly for transmitting signals of wavelength, λ, comprising an elongated electrically conductive supporting structure, at least one bay including at least two driven antennas of orthogonal polarizations carried by said support structure and defining a common radiation axis extending therefrom, means for feeding electrical energy to said driven antennas, and at least one end-fire parasitic director having a longitudinal axis and comprising at least one discrete conductive member disposed along said longitudinal axis, said discrete member having a major dimension in the planes of electric field vector of transmitted signals of wavelength λ of at least λ/4 and no more than λ/2 said end-fire director being so positioned relative to said driven antennas and support structure as to alter the shape of the radiation patterns of said driven antenna and support structure, and a metal member parallel to the elongated support structure axis of a dimension in a plane transverse to said axis of less than λ/4 and greater than λ/2 long in direction parallel to the axis, intersecting the radiation axis of the driven antennas and so located that both driven antennas are between said metal member and the said supporting structure.

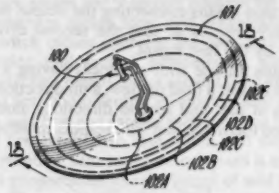
4,021,816
HEAT TRANSFER DEVICE

Wayne P. Peck, St. Petersburg, Fla., assignor to E-Systems, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 407,478, Oct. 18, 1973, Pat. No. 3,971,435, which is a continuation-in-part of Ser. No. 162,084, July 13, 1971, Pat. No. 3,803,688. This application Aug. 8, 1975, Ser. No. 603,198
The portion of the term of this patent subsequent to July 27, 1993, has been disclaimed.
Int. Cl.² H01Q *1/02, 19/12*
U.S. Cl. 343—840 **14 Claims**

5. An isothermal device, comprising an elongate metal body of substantially constant section and having opposed sides, said body having an elongate groove of substantially constant section open to one of said sides, and a separate elongate metal closure panel having sealed engagement to the opposed walls of the groove, the inner surface of said panel facing and being spaced from the groove bottom, and the longitudinal ends of said engaged panel and body being sealed to close the longitudinal ends of the groove, the inner surface of said panel

having longitudinal screen-wick formations, and said body having a closable port for admission of condensable liquid; said panel being of substantially constant section and having a body with plural elongate capillary grooves in the inner surface thereof, and said screen-wick formations comprising a single thin foraminate plate integrally united to the grooved inner surface and smoothly and uniformly bridging the grooves.



10. An antenna-element reflector construction, comprising a metal plate of desired radiation-reflecting contour on a front surface thereof, and an isothermal device according to claim 5, wherein the metal body of the isothermal device is secured to and extends on a course along a back-surface region of said plate, with the course of the body groove locally conformed to the secure course of said device to said plate.

4,021,817

METHOD OF MANUFACTURE OF ANTENNA REFLECTOR HAVING A PREDETERMINED CURVED SURFACE

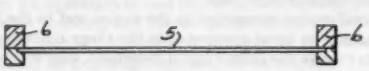
Yoshizo Shibano, Osaka; Tetsuo Hatano, Takatsuki, and Toshihiko Ohkura, Amagasaki, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Oct. 29, 1975, Ser. No. 626,752

Claims priority, application Japan, Nov. 5, 1974, 49-127297; Oct. 16, 1975, 50-124709; Oct. 16, 1975, 50-124710

Int. Cl.² H01Q *15/16*

U.S. Cl. 343—912 **8 Claims**



1. A method of forming an antenna reflector having a predetermined concave curved surface contour comprising the steps of grouping a plurality of die members having die forming protrusions on a die base, selectively adjusting the height of said die members from said die base to thereby position said die protrusions in a convex surface contour conforming to the desired concave surface contour of the reflector to be formed, engaging the perimetrical edge of a plastic blank to be formed into a reflector with press means, and forcing said blank under pressure with said press means onto said die forming protrusions and thereby forming said blank into an antenna reflector having said desired concave surface contour.

4,021,818

LIQUID PRINTING DEVICE

Curtis P. Van Vloten, Winthrop, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Sept. 22, 1975, Ser. No. 615,719

Int. Cl.² G01D *15/18*

U.S. Cl. 346—140 R **6 Claims**

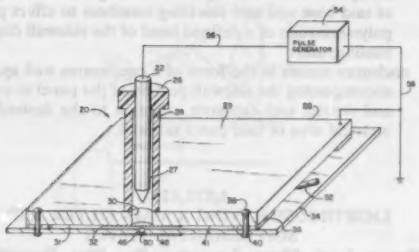
1. A printing device for printing with drops of print fluid, said device comprising in combination:

a substantially rigid body having a hollow interior and an aperture extending between said interior and the exterior of said body;

a pair of electrically-conductive electrodes disposed in spaced-apart relation within said interior;

a resiliently deformable membrane disposed so as to seal said aperture;

a base plate positioned outside said body in spaced-apart relation to said membrane so that a quantity of said printing fluid can be held to substantially fully occupy the interspace between said membrane and plate;



said base plate having at least one hole therein adjacent said membrane, said hole being sized so as to permit passage of said printing fluid only under pressure; and

means for supplying a printing fluid to the interspace between said membrane and said base plate.

4,021,819

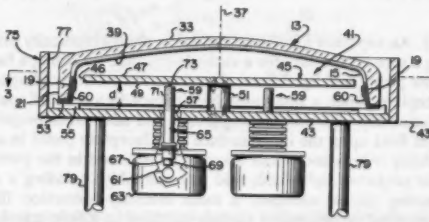
APPARATUS FOR FABRICATING A COLOR CATHODE RAY TUBE

J. Robert Barczynski, Waterloo, N.Y.; Milton L. Deffenbaugh, Columbus Grove; Melvin R. Hedrick, Ottawa, both of Ohio, and Jerry F. Janssen, Seneca Falls, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 557,966, March 13, 1975, Pat. No. 3,954,470. This application Jan. 19, 1976, Ser. No. 650,017

Int. Cl.² G03B *41/00*

U.S. Cl. 354—1 **8 Claims**



1. In relationship to a color cathode ray tube glass face panel having a viewing area with an axis therethrough and peripherally defined by a circumferential skirt-like sidewall portion having a plurality of spaced-apart mask supporting means embedded therein and terminated by a continuous sealing edge therearound, apparatus means for photo-exposing a substantially defined band-like area of radiant energy sensitive coating disposed on the interior surface of said sidewall, said apparatus comprising:

a base member having a defining plane;

an areal shielding member having top and bottom surfaces supported in a stand-off manner from said base member, said shielding member being perimetrically contoured and dimensioned to be positioned within said panel in a manner to shield the viewing area thereof, said shielding member being oriented in a plane whereof the bottom surface is parallel with the plane of said panel sealing edge and the plane of said base member;

panel positioning means located on said base member and shaped to accommodate the edge portion of said panel,

the positioning of said shielding means within said panel being determined by the height of said panel supporting means relative to the height of said shielding member standoff support;

radiant energy emission means positioned to beam exposure radiation in a manner substantially normal to the axis of said panel within the region defined by the related planes of said base and said shielding members to effect photopolymerization of a defined band of the sidewall disposed coating; and

enclosure means in the form of a continuous wall spatially encompassing the sidewall portion of the panel to confine and restrict said exposure radiation to the desired perimetrical area of said panel sidewall.

4,021,820

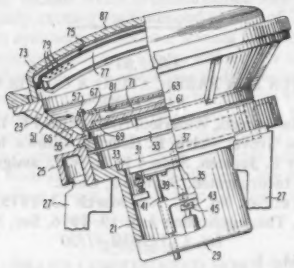
LIGHTHOUSE HAVING A MAIN FILTER AND A SUPPLEMENTAL FILTER

Thomas Louis Chase, Lancaster, Pa.; Dino Duranti, and Renato Sassoli, both of Rome, Italy, assignors to RCA Corporation, New York, N.Y. and Videocolor S.A., Paris, France, part interest to each

Division of Ser. No. 389,727, Aug. 20, 1973, Pat. No. 3,953,209. This application Oct. 23, 1975, Ser. No. 625,037

Int. Cl.² G03B *21/20*

U.S. Cl. 354—1 **1 Claim**



1. An exposure lighthouse for use in photographically printing a screen structure for a cathode-ray tube including a faceplate panel, said lighthouse comprising means for holding said faceplate panel, a small area light source in a defined spatial relationship with said holding means and adapted to project a light field upon the inner surface of a faceplate panel in said holding means and a lens assembly positioned in the path of said projected light field, said lens assembly including a diffracting optical element, a main intensity-correction filter comprised of preformed carbon particles in a light-transmitting binder, and a supplemental intensity-correction filter comprised of preformed carbon particles in a light-transmitting binder, said supplemental filter residing on a light-transmitting support and being optically in series with said main intensity-correction filter.

4,021,821

AUTOMATIC FOCUS CONTROL MOTIVE MEANS

Dean M. Peterson, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 1, 1976, Ser. No. 728,568

Int. Cl.² G03B *13/18*

U.S. Cl. 354—25 **16 Claims**

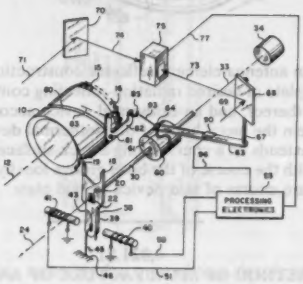
1. Apparatus for use in an autofocus system which includes a lens means having a field of view and movable along an axis, a motor, a movable scanning member, radiation receiving means and output means connected to the radiation receiving means to produce a first signal when the lens means is displaced along the axis in a first direction with respect to a desired focus position with respect to an object with the field of view comprising:

first drive means connecting the motor to the scanning member to cause the scanning member to move and transmit radiation from the field of view to the radiation receiving means;

second drive means connecting the motor to the taking lens and operable, upon activation, to move the taking lens along the axis in a direction opposite to the first direction;

first connection means connecting the output means to the second dirve means so that the second drive means is activated by the first signal.

13. Apparatus for use with a camera having a taking lens with an optic axis and a field of view, a unidirectional motor to move the lens in first and second directions along the optic axis to a desired focus position with respect to an object within



the field of view, and a range detecting system which produces an output signal having a first characteristic when the lens is beyond the desired focus position in the first direction and having a second characteristic when the lens is beyond the desired focus position in the second position comprising:

first means connected to the motor and to the lens and having an input connected to the range detecting system to receive the output signal therefrom, said first means operable upon receipt of an output signal having the first characteristic to cause the motor to move the lens in the second direction, and

second means connected to the motor and to the lens and having an input connected to the range detecting system to receive the output signal therefrom, said second means operable upon receipt of an output signal having the second characteristic to cause the motor to move the lens in the second direction.

4,021,822

ELECTRICALLY CONTROLLED SHUTTER

Kayoshi Tsujimoto, Osaka, and Toru Matsui, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 555,421, March 5, 1975, abandoned, which is a continuation of Ser. No. 429,802, Jan. 2, 1974, abandoned. This application June 30, 1975, Ser. No. 591,939

Claims priority, application Japan, Dec. 30, 1972, 48-124

Int. Cl.² G03B *7/08*

U.S. Cl. 354—31 **21 Claims**

17. A camera which comprises:

an objective lens system;

a housing structure in which a film is to be contained;

a shutter operable between an opened position and a closed position;

light detecting means including a first photoelectric element disposed in said housing structure so as to receive a light from an object traversing said lens system and said shutter and reflected from the face of said film and a second photoelectric element disposed outside of said housing structure so as to receive said light directly from said

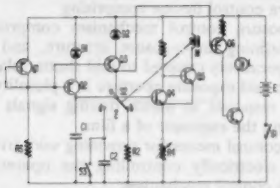
object, said first and second photoelectric elements being capable of generating outputs respectively representative of said light received thereby and said light detecting means being capable of generating currents proportional to said outputs;

resistance means connected to said light detecting means;

capacitance means connected to said light detecting means;

first switch means operable between a first position for connecting said resistance means in parallel to said capacitance means and a second position for disconnecting said resistance means from said capacitance means;

second switch means operable between a first position for connecting said second photoelectric element to said light detecting means and a second position for connecting said first photoelectric element to said light detecting means, said first and second switch means being normally in said first position so that, when said shutter is in said closed position, said capacitance means is charged by said current proportional to said output of said second photoelectric element until voltage thereacross becomes equal to that which arises across said resistance means;



switch operating means for operating said first and second switch means to said second position prior to the operation of said shutter to said opened position when said voltage across said resistance means is lower than a given level so that said capacitance means is further charged by said current proportional to said output of said first photoelectric element;

shutter closing means for operating said shutter from said opened position to said closed position when said voltage across said capacitance means reaches said given level after the operation of said shutter to said opened position;

means for reducing said current proportional to said output of said second photoelectric element by an amount dependent on diaphragm aperture to be set; and

third switch means operable between a first position for rendering said reducing means operative and a second position for rendering said reducing means non-operative, said third switch means being normally in said first position, and said switch operating means being also capable of operating said third switch means to said second position prior to the operation of said shutter to said opened position when said voltage across said resistance means is lower than said given level.

4,021,823

PHOTOMETRIC DEVICE BUILT INTO VIEWFINDER SYSTEM FOR A SINGLE LENS REFLEX CAMERA

Katsuhiko Miyata, Saitama, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 11, 1975, Ser. No. 612,277

Claims priority, application Japan, Sept. 30, 1974, 49-118010[U]

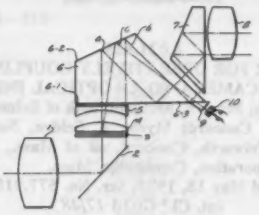
Int. Cl.² G03B 7/08

U.S. Cl. 354—31 **3 Claims**

1. In a single lens reflex camera having a focusing screen upon which an image is formed, an eyepiece, and means defining an optical path so that the image can be viewed through the eyepiece, an arrangement for a through-the-lens photometric system comprising:

a first prism forming part of the optical path, the first prism having a roof face and a reflecting face, the first prism being positioned with respect to the focusing screen and with respect to the eyepiece such that a first, light-entering region of the reflecting face is aligned in parallel with the focusing screen to define a finder field and a second region of the reflecting face outside the finder field has light reflected thereto from the roof face;

a light-receiving photometric element;



a second prism adhered to the second region of the reflecting face for causing a portion of the light reflected from the roof face to impinge upon the light receiving element, the second prism defining an optical axis which is aligned with a light path of light coming from the center of the focusing screen.

4,021,824

FLASH LIGHT PHOTOGRAPHIC SYSTEM FOR CAMERA

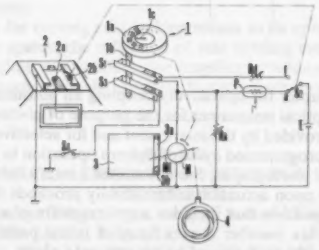
Takashi Uchiyama, Yokohama; Yukio Mashimo, Tokyo; Zenzo Nakamura, Urawa, and Yoji Sugiura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed June 4, 1975, Ser. No. 583,633

Claims priority, application Japan, June 7, 1974, 49-64710

Int. Cl.² G03B 7/16

U.S. Cl. 354—33 **36 Claims**



1. A photographic camera for use with a flash device, which can be selectively operated at a first operating mode to adapt it to ordinary photography without the use of said flash device, and a second operating mode to adapt it to a flash photography with the use of said flash device, wherein said camera comprises:

A. a manually operable setting means for setting an exposure value at said camera, having a plurality of setting positions which permits the setting of a plurality of exposure values and containing at least one exposure value which can be commonly used both in ordinary photography and flash photography, and

B. a mode selecting means to select automatically an operating mode of said camera, having:

1. a first detecting means to detect the exposure value set by said setting means, and

2. a second detecting means to detect the state of flash preparation of said flash device, wherein the operating mode of said camera is set at said second mode only when the exposure value is set at a value suitable for flash photographing and said flash device is in a flash-prepara-

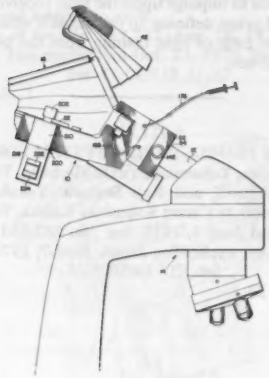
tion completed state, and the operating mode of said camera is set at said first mode when at least one condition out of the condition of setting the exposure value to a value suitable to flash photographing and the condition of completion of flash preparation of the flash device is not satisfied.

4,021,825

ADAPTER FOR OPERATIVELY COUPLING AN AUTOMATED CAMERA TO AN OPTICAL INSTRUMENT

John J. McCann; Mary A. McCann, both of Belmont; William T. Plummer, Concord; Myron A. Seiden, Needham, and Vivian K. Walworth, Concord, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 15, 1975, Ser. No. 577,915
Int. Cl.² G03B *17/48*
U.S. Cl. 354—79 **22 Claims**



1. An adapter for operatively coupling an automated camera to an optical instrument for the purpose of photographing an image provided by the instrument and for selectively modifying a preprogrammed cycle of camera operation to facilitate taking such photographs, the automated camera being of the type which upon actuation automatically proceeds through a cycle of operation that includes a pre-exposure phase during which a reflex member moves from an initial position to an exposure position, followed by an exposure phase, under the control of a light sensing circuit formed in part by a camera mounted photocell, during which a shutter operates to allow image-bearing light received by the camera objective lens to expose a film unit within the camera, the length of the exposure interval being determined by the intensity of the image-bearing light incident upon the photocell, the exposure phase being followed by a post exposure phase during which the reflex member moves back to the initial position, followed by termination of the cycle, said adapter comprising

an adapter body including means for receiving and supporting such an automated camera thereon;

means for coupling said adapter body to an optical instrument such that the objective lens of the camera supported thereon is operatively positioned to receive image-bearing light provided by the instrument; and

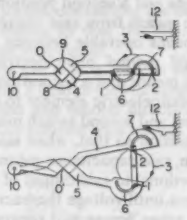
means on said adapter body for inserting a user controlled delay into the automatic cycle of camera operation between the pre-exposure and film exposure phases for allowing vibrations induced by the movement of the reflex member during the pre-exposure phase to subside prior to the initiation of film exposure.

4,021,826

CAMERA CONTROL DEVICE

Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Company, Ltd., Japan

Filed Apr. 14, 1975, Ser. No. 567,491
Claims priority, application Japan, Apr. 16, 1974, 49-43174
Int. Cl.² G03B *19/02, 17/42*
U.S. Cl. 354—209 **10 Claims**



1. A camera control device comprising

A. an exposure control mechanism comprising shutter blades defining an exposure aperture, and a stepping motor operatively coupled to said shutter blades to open and close said exposure aperture in a plurality of discrete steps in response to motor driving signals applied for controlling the exposure of a film;

B. shutter control means for providing said driving signals, thereby electrically controlling the operation of said exposure control mechanism;

C. film transporting means electrically connected to said exposure control mechanism and including a motor for transporting the film by a predetermined length in response to closing of said exposure aperture;

D. operation mode control means electrically connected to said exposure control mechanism, said film transporting means and a power supply for selectively interfering with the response of said film transporting means to said shutter blades;

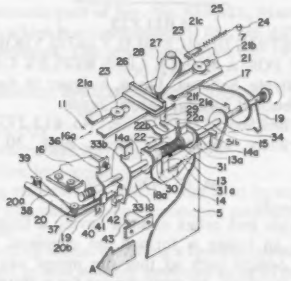
E. said power supply comprising means for supplying the power to said shutter control means, said film transporting and said operation mode control means.

4,021,827

FILM FORWARDING MEANS

Hirokazu Ichii, Omiya, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 29, 1975, Ser. No. 608,950
Claims priority, application Japan, Aug. 30, 1974, 49-100073; Aug. 30, 1974, 49-100074
Int. Cl.² G03B *1/00*
U.S. Cl. 354—212 **2 Claims**



1. In a camera having an openable and closeable rear cover, means for positioning at least exposed film in a camera inter-

ior portion thereof facing said rear cover and film forwarding means, the improvement wherein said film forwarding means comprises a reciprocal member disposed in a camera main body interior portion alongside and generally parallel to the direction of forwarding of said exposed film, drive means actuable to drive said reciprocal member in a forward direction, carrier means engaged by said reciprocal member and disposed rearwardly thereto with respect to said camera interior, forwarding pawl means carried by said carrier means for approaching said exposed film from the rear and engaging an engagement portion thereof, guide shaft means fixedly mounted along a line extending parallel to the line of forwarding of said exposed film, said carrier means being slidably and rotatably mounted on said guide shaft means and being moveable by said drive means along said guide shaft means, and position change means moveable to different positions in conjunction with opening and closing of said rear cover, and being operable to move at least said pawl means carried by said carrier means to a first position wherein said exposed film is engaged thereby when said rear cover is closed, and to a second position wherein said pawl means is clear of a position for engagement of said exposed film when said rear cover is open.

4,021,828

FILM COUNTER

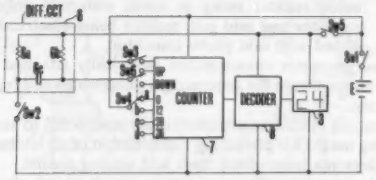
Yukio Iura, Yokosuka; Masayoshi Yamamichi, Kawasaki; Takashi Uchiyama, Yokohama; Tetsuya Taguchi, Kawasaki, and Yukio Mashimo, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Japan

Filed Feb. 3, 1975, Ser. No. 546,562

Claims priority, application Japan, Feb. 13, 1974, 49-17921; July 10, 1974, 49-78989; July 11, 1974, 49-79523

Int. Cl.² G03B *17/36*

U.S. Cl. 354—217 **14 Claims**



1. An electrical film counter comprising a camera having a film transport mechanism and an openable back cover, and arranged to have a film cartridge inserted thereinto

pulse generating means cooperable with said film transport mechanism to generate one pulse responsive to each advance of the film in said camera by one frame;

a first pulse counter having an input connected to said pulse generating means and operable to count the pulses from said pulse generating means;

film frame indicating means connected to said first pulse counter and operable to indicate the number of film frame corresponding to the content of said first pulse counter;

a source of electric potential; and

first switching means placed in an "on" state responsive to closing of said back cover and placed in an "off" state responsive to opening of said back cover, said first switching means being connected between a source of electric potential and a power supply terminal of said first pulse counter to enable said first pulse counter to operate.

4,021,829

CAMERA ATTACHMENT OPERATING DEVICE FOR SETTING EXPOSURE FACTOR

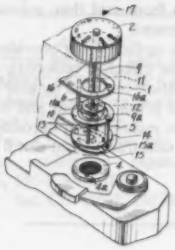
Minoru Sekida, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Japan

Filed Dec. 5, 1975, Ser. No. 638,271

Claims priority, application Japan, Dec. 23, 1974, 49-2530

Int. Cl.² G03B *13/02*

U.S. Cl. 354—219 **10 Claims**



1. An operating device on a camera attachment removably connected to a camera body, which camera body includes an exposure factor setting mechanism, the operating device comprising:

an operating knob movable to at least one predetermined operative position at which said knob is to be locked, and to other positions thereof;

means movable together with said operating knob for coupling said operating knob with said exposure factor setting mechanism;

means for locking said operating knob at said predetermined position when in its operative position,

said locking means being movable between an inoperative and an operative position;

means for holding said locking means in its inoperative position;

means for moving said locking means to its operative position against the influence of said holding means as said coupling means effects the coupling between said operating knob and said exposure factor setting mechanism.

4,021,830

INFORMATION INDICATING DEVICE IN A CAMERA VIEWFINDER

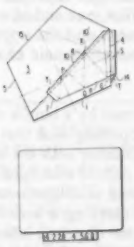
Kyusei Kanno, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,497

Claims priority, application Japan, May 30, 1974, 49-61111

Int. Cl.² G03B *13/02, 19/12*

U.S. Cl. 354—225 **3 Claims**



1. An information indicating device for a viewfinder of a camera using a pentaprism of the type having a first transmission face for transmitting a real image formed thereon, first, second and third reflection surfaces for internally reflecting

said real image, and a second transmission face for transmitting said real image reflected from said third reflection surface, said indicating device comprising:

a thin, substantially triangular shaped prism element having a shape similar to the shape of a side face of said pentaprism and attached to the external surface of said side face and positioned to receive light information along one face of the triangular prism element, and

a second thin prism means attached to the external surface of said third reflection surface and positioned to receive light information from said thin, substantially triangular shaped prism element,

said third reflection surface being provided with a transparent slot within the effective reflecting area thereof, and said light information received by said thin, substantially triangular shaped prism element and transmitted to said second thin prism means being introduced into said pentaprism through said transparent slot by said second thin prism means.

4,021,831

PROCESS AND DEVICE FOR THE PHOTOGRAPHIC REPRODUCTION OF DIAPOSITIVES

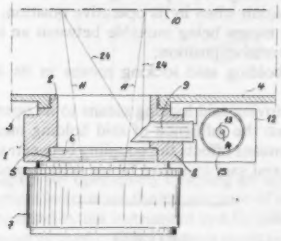
Francois L. Bercher, Tour-de-Peilz, Switzerland, assignor to Elinca S.A., Renens, Switzerland

Filed Dec. 13, 1974, Ser. No. 532,498

Claims priority, application Switzerland, Feb. 5, 1974, 1547/74

Int. Cl.² G03B *17/56, 15/03*

U.S. Cl. 354—295 **3 Claims**



1. A device for the photographic reproduction of diapositives wherein during exposure of a film to light from an illuminated diapositive, the film is simultaneously partially fogged by diffused light reaching the said film directly and without passing through the diapositive, said device comprising:

a chamber having a central opening adapted to be aligned with the path of the light rays forming an image of the diapositive on the film, one end of which central opening is secured to a camera and the opposite end of which is secured to the camera lens, said chamber having a transverse opening;

a light source;

a light conductor formed by a bunch of fibers and disposed in said transverse opening such that one end of said light conductor communicates with the interior of said chamber and the other end of said light conductor is outside the chamber opposite said light source; and

a rotatable cylinder carrying a series of neutral filters of different gradiations disposed about said light source whereby upon actuation of said light source, light from said light source passes through one of the series of neutral filters of the rotatable cylinder and then is conducted via said light conductor to said chamber, and then the diffused light illuminates the film to provide partial fogging thereof.

4,021,832

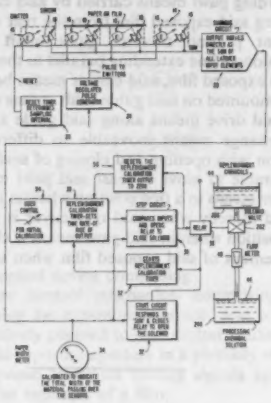
PHOTOCELL CONTROL DEVICE FOR A PHOTOGRAPHIC FILM PROCESSOR

Vivian D. Krehbiel, and Carl E. Cord, both of Wichita, Kans., assignors to Kreonite, Inc., Wichita, Kans.

Filed Aug. 5, 1974, Ser. No. 494,875

Int. Cl.² G03D *13/00*

U.S. Cl. 354—298 **16 Claims**



1. An infrared sensed chemical replenishing system for a photosensitive material processor, the system comprising:

a power supply;

a pulsed infrared sensing means including;

emitter means having an infrared emitting diode, said sensing means electrically connected to said power supply for measuring the width of photosensitive materials without touching the same, said sensing means having an infrared-sensitive photo transistor, an anode resistor, a gate resistor, and a programmable unijunction transistor having its gate electrode attached between said gate resistor and said photo transistor, said anode resistor being in series with said unijunction transistor and said gate resistor being electrically connected with said photo transistor;

pulse generator circuit means electrically attached to said emitter means for generating a pulse width and repetition rate;

summing circuit means electrically connected to said sensing means for producing a summation of all latched input elements transmitted from said sensing means;

replenishment calibration timing circuit means electrically attached to said sensing means and said summing circuit means for producing at least one replenishment command signal following at least one successive time interval, said time interval being equal to the time required to turn a processor drive used in driving the processor one revolution; and

control circuitry means electrically connected with said summing circuit means and said timing circuit means for controlling the chemical flow of the replenishment system.

4,021,833

INFRARED PHOTODIODE

Mark N. Gurnee, Fridley, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 17, 1976, Ser. No. 687,056

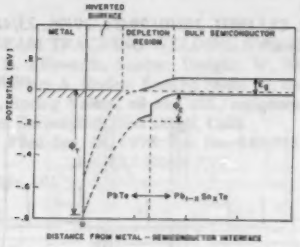
Int. Cl.² H01L *29/48, 27/14*

U.S. Cl. 357—15 **9 Claims**

1. An infrared sensitive photodiode comprising:

a body of a first semiconductor material, $Pb_{1-x}Sn_x$ $Te_{1-y}Se_y$, where $0 \leq x \leq 1$ and $0 \leq y \leq 1$;

a thin layer of a second semiconductor material on at least a portion of a surface of the body, forming a heterojunction to the body of the first semiconductor material, the second semiconductor material having a wider bandgap than the first semiconductor material; and



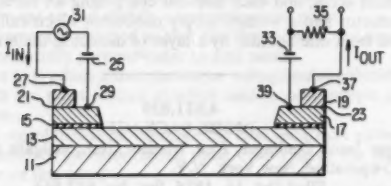
Schottky barrier means attached to the thin layer, wherein the heterojunction is within a depletion region associated with Schottky barrier means.

2. The infrared sensitive photodiode of claim 1 wherein the second semiconductor material is $Pb_{1-x'}Sn_{x'}Te_{1-y'}Se_{y'}$, where $x > x' \geq 0$ and/or $y > y' \geq 0$.

4,021,834
RADIATION-RESISTANT INTEGRATED OPTICAL SIGNAL COMMUNICATING DEVICE

Arnold S. Epstein, Washington, D.C.; Stewart Share, Brookeville, and Roland A. Polimadei, Rockville, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 31, 1975, Ser. No. 645,745
Int. Cl.² H01L *31/12*
U.S. Cl. 357—19 **10 Claims**



1. A radiation hardened integrated optical signal communicating device associating an optical waveguide for guiding a light wave with a light-emitting junction for emitting the light wave and a light-collecting junction for receiving at least a part of the light wave, and comprising:

a flat substrate of GaAs of n^+ conductivity type and a doping level of 10^{18} atoms/cm³;

a film arranged upon one of the faces of said substrate, said film forming the waveguide and having a refractive index greater than that of said substrate, wherein said film is $Ga_{1-y}Al_yAs$, is of n conductivity type and has a doping level of 10^{16} atoms/cm³ and y lies in the range 0.01 to 0.34;

first dielectric means for coupling light into the waveguide;

second dielectric means for extracting light from the wave guide;

a first pair of semiconductor regions of opposite conductivity in contact with said first dielectric means and defining the light-emitting junction;

a second pair of semiconductor regions of opposite conductivity in contact with said second dielectric means and defining the light-collecting junction;

wherein the semiconductor is $Ga_{1-x}Al_xAs$ and x lies in the range 0.01 to 0.034;

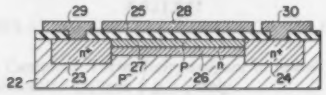
means for applying a bias to the light-emitting junction to inject charge carriers thereby producing a recombination light wave, the light wave traveling through the optical waveguide; and

means for applying a bias to the light-collecting junction to collect the charge carriers which are generated due to the absorption of the light wave at the light-collecting junction.

4,021,835
SEMICONDUCTOR DEVICE AND A METHOD FOR FABRICATING THE SAME

Jun Etoh, and Toshiaki Masuhara, both of Hachioji, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 27, 1975, Ser. No. 544,265
Claims priority, application Japan, Jan. 25, 1974, 49-10179; Jan. 25, 1974, 49-10180
Int. Cl.² H01L *29/78*
U.S. Cl. 357—23 **2 Claims**



1. A semiconductor device comprising:

a semiconductor body having one of *p* and *n* conductivity types;

a source region of an opposite conductivity type to that of said semiconductor body, disposed in a first surface portion of said semiconductor body;

a drain region of the same conductivity type as that of said source region, disposed in a second surface portion of said semiconductor body, spaced spart from said first surface portion of said semiconductor body in which said source region is disposed;

a first semiconductor region, whose conductivity type is opposite to that of said semiconductor body, whose impurity concentration is higher than that of said semiconductor body and whose impurity dosage is within a range between $2 \times 10\,8$ cm^{-2} and 1×10^{10} cm^{-2}, disposed within said semiconductor body between said source and drain regions;

a second semiconductor region whose conductivity type is opposite to that of said first semiconductor region, whose impurity concentration is higher than that of said first semiconductor region and whose impurity dosage is within a range between 6.6×10^{10} cm^{-2} and 1.2×10^{12} cm^{-2}, disposed in said semiconductor body between said source and drain regions and directly upon said first semiconductor region;

an insulating layer disposed on the surface of said semiconductor body between said source and drain regions;

a gate electrode disposed on said insulating layer; and

electrodes connected to said source and drain regions, respectively.

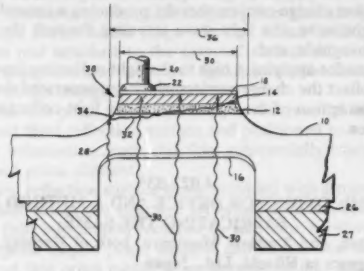
4,021,836
INVERTED HETEROJUNCTION PHOTODIODE

Austin M. Andrews, II; John E. Clarke, both of Newbury Park; Edward R. Gertner; Joseph T. Longo, both of Thousand Oaks, and Richard C. Eden, Newbury Park, all of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 12, 1976, Ser. No. 566,159
Int. Cl.² H01L *27/14, 29/161*
U.S. Cl. 357—30 **1 Claim**

1. An inverted heterojunction photodiode particularly adapted to operate as a detector for 10.6 μm laser applica-

tions comprising (A) a transparent substrate composed of a PbTe mixed crystalline material; (B) a first epitaxially grown



buffer layer of a $Pb_{.90}Sn_{.10}Te$ crystalline material interdisposed between said substrate; and (C) a second epitaxially grown active layer of a $Pb_{.80}Sn_{.20}Te$ crystalline material.

4,021,837

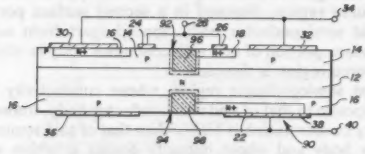
SYMMETRICAL SEMICONDUCTOR SWITCH HAVING CARRIER LIFETIME DEGRADING STRUCTURE

Jearld L. Hutson, P.O. Box 34235, Dallas, Tex. 75234

Filed Apr. 21, 1975, Ser. No. 569,695

Int. Cl.² H01L *29/747*

U.S. Cl. 357—39 **7 Claims**



1. A semiconductor switch having symmetrical switching characteristics comprising:

a semiconductor body having at least three layers of alternating first and second types of semiconductor material to form a plurality of interior P-N junctions, the first and second outer layers of said body being of said first type,

first and second grooves formed in said first and second outer layers to electrically separate each of said outer layers into two areas, at least one of said interior layers being common to each of said two areas,

said grooves including glass doped with material selected from a group comprising gold and platinum and operable to substantially eliminate the passage of carriers laterally across said body through said common interior layer from one of said areas to the other,

a first region of said second type of semiconductor material formed in one of said areas of said first outer layer,

a second region of said second type of semiconductor material formed in the other of said areas of said first outer layer, said first groove being disposed between said first and second regions,

a first electrode contacting one of said areas and said first region,

a second electrode contacting the other of said areas and said second region,

a third region of said second type of semiconductor material formed in said second outer layer in one of said areas, and

a third electrode contacting said second outer layer and said third region.

4,021,838

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICES

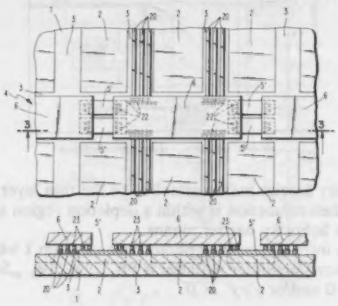
William Arthur Warwick, Winchester, England, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,878

Claims priority, application United Kingdom, Nov. 20, 1974, 0050342/74

Int. Cl.² H01L *27/10, 29/34, 29/06, 23/48*

U.S. Cl. 357—68 **12 Claims**



1. A semiconductor integrated circuit device comprising a semiconductor wafer containing a plurality of integrated circuit islands arranged in rows defining therebetween channels, said channels providing pathways for electrical signal interconnections between circuit islands, each circuit island having associated therewith terminals solely for the supply of electrical power thereto, a plurality of conductive power feeding paths formed on the substrate and each extending from one of said terminals to a contact area in one of said channels, and a power bus passing along the channel over said electrical signal interconnections and consisting of at least one power distribution element mounted on the substrate, each distribution element having contacts bonded to selected ones of said contact areas, and each element comprising an earth return conductor and a voltage supply conductor electrically separated from one another by a layer of dielectric material.

4,021,839

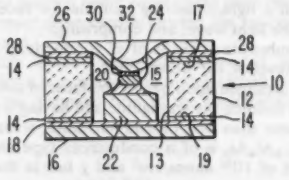
DIODE PACKAGE

Edgar Jacob Denlinger, East Windsor, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 16, 1975, Ser. No. 622,866

Int. Cl.² H01L *23/02, 23/12, 23/28, 23/42*

U.S. Cl. 357—74 **7 Claims**



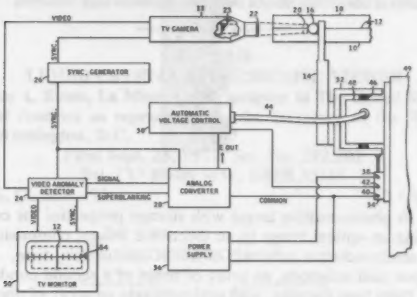
1. A diode package comprising a compressible dielectric member having two major substantially parallel opposite surfaces and having an aperture extending perpendicularly through said major opposite surfaces, an electrically conductive base covering and soldered to one of said major surfaces of said dielectric member, a semiconductor diode within said aperture, said diode having two terminals oppositely situated, one of said terminals of said diode being soldered to said base, an electrically conductive lid covering and soldered to said

other major surface of said dielectric member, said lid being further soldered to the other of said terminals of said doide subsequent to said compressible dielectric member being compressed an amount sufficient for said lid to make an electrical connection with said other terminal of said diode.

4,021,840
SEAM TRACKING WELDING SYSTEM

Archibald B. Ellsworth, Santee; Douglas W. Mayberry, El Cajon; William A. Roden, Rancho Santa Fe, and Cleveland E. Roye, Spring Valley, all of Calif., assignors to General Dynamics Corporation, San Diego, Calif.

Filed Jan. 24, 1975, Ser. No. 543,715
Int. Cl.² H04N 7/18
U.S. Cl. 358—101 **5 Claims**



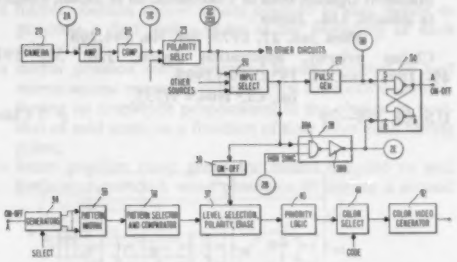
1. An automatic seam-tracking welding system comprising:
a welding means positioned adjacent to a point along a seam in a workpiece to be welded;
carriage means to move said welding means and workpiece seam relative to each other with said welding means remaining generally aligned with said seam during welding;
a television camera of the raster-scan type mounted independently of said carriage means and aimed at an area adjacent to and slightly overlapping said point;
said camera positioned so that the direction of said scan is substantially perpendicular to said seam;
means to produce a time incidence voltage pulse coinciding with the point in time at which said scan intercepts said seam;
video signal means to reference the time incidence pulse to a standard synchronization pulse occurring at the initiation of line scan;
video anomaly detector means to process the output of said video signal means and produce an output voltage analogous to the position of said seam;
servo means controlled by said signal to move said welding head to a position analogous with said output voltage signal;
whereby said welding means is maintained over and aligned with said seam during welding.

4,021,841
COLOR VIDEO SYNTHESIZER WITH IMPROVED IMAGE CONTROL MEANS

Ralph Weinger, 7819 Deer Run Road, Philadelphia, Pa. 19118

Filed Dec. 31, 1975, Ser. No. 645,633
Int. Cl.² H04N 5/22
U.S. Cl. 358—22 **17 Claims**

1. A system for generating a video display signal which represents a first signal modified as a function of a second separately derived image signal, comprising:
a. a function generator for generating a predetermined video signal, and being controllable to an on or off operating condition;
b. an image signal generator for generating an image video signal;
c. control signal means for generating an on-off control signal from said image video signal; and

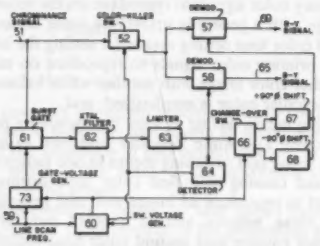


d. means for controlling the operation of said function generator with said control signal.

4,021,842
DEMODULATING CIRCUIT FOR COLOR TELEVISION SIGNALS

Armando Campioni, Turin, Italy, assignor to Indesit Industria Elettrodomestici Italiana S.p.A., Italy

Filed Apr. 28, 1975, Ser. No. 572,675
Int. Cl.² H04N 9/50
U.S. Cl. 358—24 **11 Claims**

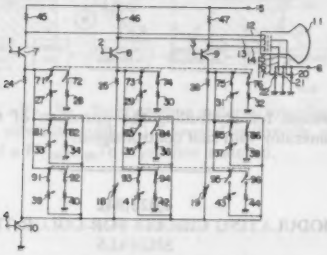


1. Circuit arrangement for demodulating the chrominance signal portion of a color television signal in an apparatus for receiving at least said color television signal, the chrominance signal being coded according to a system in which two color-difference signals are inserted therein by means of a subcarrier modulation process and simultaneously transmitted, a periodic line scanning frequency switching of the subcarrier phase taking place, there being present in said chrominance signal a single signal of constant phase having a plurality of oscillations at the subcarrier frequency and serving as a reference signal for generation of a reference subcarrier for the demodulation of said modulated subcarrier and as an identification signal for controlling a change-over switch which operates at line frequency to ensure that the two color-difference signals are demodulated with correct phases of said reference subcarrier, said single signal being inserted in part of every second line scanning period of said modulated subcarrier, said arrangement comprising a passive crystal filter, at least a first electronic gate which opens during every second line scanning period, said first gate receiving said chrominance signal and allowing the passage of said single signal to said passive crystal filter which supplies a pluraltiy of oscillations at the frequency of said subcarrier, an amplitude detector circuit which receives said plurality of oscillations from said filter for supplying said identification signal, and a switching voltage generator controlled by said identification signal for controlling said opening of said first gate at every second line and providing a signal to drive said change-over switch.

4,021,843
COLOR TONE CONTROL DEVICE IN COLOR TELEVISION RECEIVER

Yoshisada Taniguchi, Fujisawa; Toshihiko Tsuji, and Masanori Oguino, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 27, 1975, Ser. No. 544,268
Claims priority, application Japan, Jan. 30, 1974, 49-11891; Jan. 31, 1974, 49-12995
Int. Cl.² H04N 9/535
U.S. Cl. 358—29 7 Claims

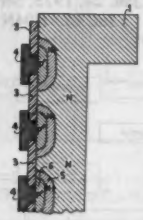


1. A color tone control device in a color television receiver comprising:
a source of a luminance signal;
a source of color difference signals;
means for generating primary color signals by matrixing
first color tone setting means for setting intensities of said primary color signals to reproduce on the receiver a color image with a generally preferably white balance;
second color tone setting means for setting the intensities of said primary color signals to reproduce on said receiver another color image with another white balance in which a particular color is emphasized; and
switching means having at least two switching positions for switching said white balances from one to another and vice versa, said switching means in one switching position thereof causing said first color tone setting means to effect to reproduce an image with said generally preferable white balance and in another switching position thereof causing said second color tone setting means to effect to reproduce an image with said another white balance emphasized in said particular color;
and in which said means for generating three primary color signals comprises:
a first amplifier for applying a first primary color signal to a color picture tube by receiving a first color difference signal and a luminance signal;
a second amplifier for applying a second primary color signal to said color picture tube by receiving a second color difference signal and said luminance signal; and
a third amplifier for applying a third primary color signal to said color picture tube by receiving a third color differenc signal and said luminance signal; and
in which each of said amplifiers comprises a transistor, a first resistor connected to the emitter of said transistor, and a second resistor connected to the collector of said transistor, different color difference signals being applied to the bases of said different transistors respectively, said luminance signal being applied to the emitters of said transistors through said first resistors respectively, a D.C. voltage being applied to the collectors of said transistors through said second resistors respectively; and in which said first color tone setting means comprises first means connecting a third resistor in parallel to said first resistor of said first amplifier through a first switch, and second means connecting a fourth resistor in parallel to said first resistor of said second amplifier through a second switch, and in which said switching means comprises said first and second switches operating in such a manner that the on-off operation of said first switch is opposite to that of said second switch.

4,021,844
PHOTOSENSITIVE DIODE ARRAY STORAGE TARGET

Jean-Roger Gilles, and Daniel Woehrn, both of Paris, France, assignors to Thomson-CSF, Paris Cedex, France

Continuation of Ser. No. 419,365, Nov. 27, 1973, abandoned.
This application June 6, 1975, Ser. No. 584,263
Claims priority, application France, Dec. 1, 1972, 72.42826
Int. Cl.² 357 89; H01L 27/14
U.S. Cl. 357—31 8 Claims

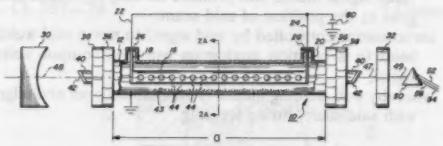


1. A photosensitive target with storage properties for converting an optical image to an electronic image, comprising:
a semiconductor substrate of a first conductivity type,
upon said substrate, an array of zones of a second conductivity type forming, with said substrate an array of photodiodes,
means for reverse biasing said photo-diodes,
said photodiodes being constituted by hyper-abrupt junctions whose junction capacitance C varies in accordance with the reverse bias voltage V applied to them by said reverse biasing means, in proportion with V^{-m}, where $m > \frac{1}{2}$,
and upon said array of photo-diodes an array of insulating material zones, said insulating material zones being disposed between said photo-diodes.

4,021,845
LASER FOR GENERATING WHITE LIGHT

Shing Chung Wang, Temple City, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 16, 1975, Ser. No. 623,167
Int. Cl.² H01S 3/02; H04N 1/46
U.S. Cl. 358—75 35 Claims



1. A laser tube responsive to a predetermined voltage applied thereto for producing a discharge therein comprising:
a gas-filled envelope having a longitudinal axis,
an anode electrode forming a portion of said envelope,
a hollow-cathode located within said envelope, said hollow-cathode being coaxially disposed with respect to said anode electrode portion of said envelope and concentric therewith,
coaxially aligned end members, said end members and said envelope being adapted to provide a structure for confining a gaseous medium therein,
means for generating a dc voltage, and
means for applying said dc voltage between said anode

electrode and said hollow-cathode whereby a discharge between said cathode and said anode electrode is created.

30. A laser tube responsive to a predetermined voltage applied thereto for producing a discharge therein comprising:

a gas-filled envelope having a longitudinal axis,

an anode electrode forming a portion of said envelope,

a hollow-cathode located within said envelope, said hollow-cathode being coaxially disposed with respect to said anode electrode portion of said envelope and comprising a perforated, hollow cylindrical member supported within said anode electrode,

coaxially aligned end members, said end members and said envelope being adapted to provide a structure for confining a gaseous medium therein,

means for generating a dc voltage, and

means for applying said dc voltage between said anode electrode and said hollow-cathode whereby a discharge between said cathode and said anode electrode is created.

4,021,846

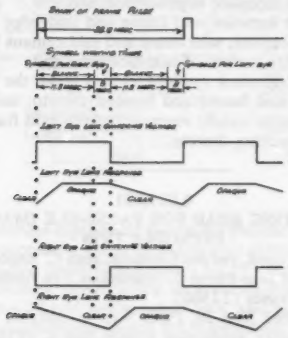
LIQUID CRYSTAL STEREOSCOPIC VIEWER

John A. Roese, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 25, 1972, Ser. No. 292,201

Int. Cl.² H04N *9/58;* **G03B** *35/16*

U.S. Cl. 358—92 **23 Claims**



1. An optical device, useful for three-dimensional stereo viewing not requiring any mechanical shuttering, comprising:

two liquid crystal lenses, each comprising:

a thin layer of liquid crystal material;

two plates of conductively-coated transparent material enclosing the liquid crystal, each plate being connectable to a source of voltage, and each plate being insulated from the other;

a front polarizing sheet forming the outside surface of the crystal lens; and

a rear polarizing sheet forming the inner surface of the crystal lens;

the axis of polarization of the front polarizing sheet being at an angle to the axis of polarization of the rear polarizing sheet.

4,021,847

COMPENSATION CIRCUIT FOR PYROELECTRIC VIDICON SYSTEM

Peter W. Van Atta, Woodbridge, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 15, 1976, Ser. No. 705,498

Int. Cl.² H04N *5/33, 5/34*

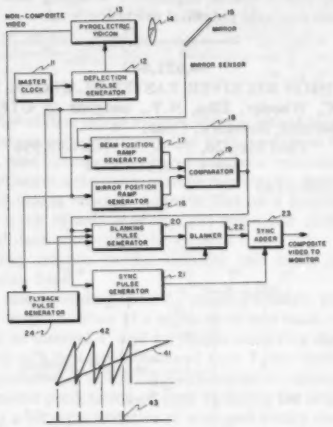
U.S. Cl. 358—113 **2 Claims**

1. In a pyroelectric vidicon system wherein a rotating mirror periodically slowly scans a rectangular radiation scene horizontally across the target material of a vidicon tube primarily in one direction only while a set of horizontal and vertical sawtooth generators scan an electron beam over the same target many times to generate a TV type non-composite video signal, a compensation circuit comprising:

a mirror position sensor means coupled to said mirror to generate a first timing pulse at the beginning of each mirror scan;

a mirror position ramp generator means coupled to said mirror sensor means to initiate a first sawtooth waveform having an amplitude proportional to the change in position of said scene as a function of time from each timing pulse;

a beam position ramp generator means coupled to said horizontal sawtooth wave generator to initiate a second



linear sawtooth waveform synchronized to the output of said horizon generator and having an amplitude equal to *n* times the amplitude of said output where *m* is the ratio of the width of the scene to the maximum change in position of the scene;

a comparator means coupled to said mirror position and beam position ramp generators for generating a delayed timing pulse when the amplitude of both said ramp generators are equal;

a synch pulse generator means coupled to said comparator means to generate a synch pulse for each said delayed timing pulse; and

adder means connected between said vidicon system and said synch pulse generator to combine said video signals with said synch pulses.

4,021,848

ADJUSTABLE APERTURE CORRECTION SYSTEM

Gopal Krishna Srivastava, Schaumburg, Ill., and Robert Charles Wheeler, Elba, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Continuation-in-part of Ser. No. 369,968, June 14, 1973, abandoned. This application Apr. 30, 1975, Ser. No. 573,057

Int. Cl.² H04N *5/48*

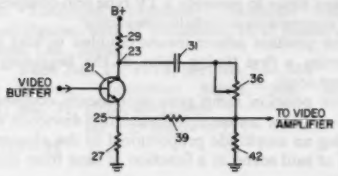
U.S. Cl. 358—162 **7 Claims**

7. An aperture correction system for a signal receiver having a source of video signals comprising:

a transistor having a signal input terminal connected to said source of video signals and first and second signal output terminals providing output signals of opposite phase; and

circuit means having a first impedance coupling said first signal output terminal to a potential source, a capacitor coupled to said first signal output terminal, an adjustable impedance in the form of an alterable resistor coupling said capacitor to a summing terminal, a second imped-

ance coupling said summing terminal to said second signal output terminal, a third impedance coupling said



second signal output terminal to a potential reference level, and a fourth impedance coupling said summing terminal to said potential reference level.

4,021,849

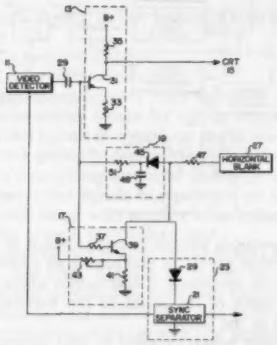
TELEVISION RECEIVER RASTER BLANKING SYSTEM

Robert C. Wheeler, Elba, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed May 26, 1976, Ser. No. 689,996

Int. Cl.² H04N 3/24

U.S. Cl. 358—165 **9 Claims**



5. A raster blanking system for a television receiver having a cathode ray tube coupled to a video signal source and to a blanking pulse signal source, said raster blanking system comprising:

bias circuit means coupled to said video signal source for effecting development and application of a bias potential to said cahtode ray tube; and

detector means coupled to said bias circuit means, to said blanking pulse signal source, and to said video signal source, said detector means effecting non-conductivity causing application of a given level of bias potential to said cathode ray tube in response to a modulated signal from said video signal source and conductivity causing application of an altered level of bias potential to said cathode ray tube in response to an unmodulated video signal from said video signal source.

4,021,850

COLOR TELEVISION PICTURE TUBES WITH IMPROVED IMPLOSION PROTECTION SYSTEM

Melvin F. Rogers, Western Springs, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Oct. 20, 1975, Ser. No. 623,854

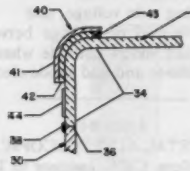
Int. Cl.² H01J 31/00

U.S. Cl. 358—245 **8 Claims**

1. A color television picture tube having a glass bulb with an approximately rectangular, flangeless, curved faceplate having a convex front surface through which television pictures are viewed, a concave rear surface, and a peripheral edge surface connecting the convex front surface and the concave rear surface of the faceplate, the peripheral edge surface being contoured, that is, having sides which depart from and return to a plane connecting the four corners of the faceplate, the glass bulb also having a funnel having a convex seal land which mates with the concave inner surface of the faceplate to define a contoured sealing interface, said tube including a hybrid implosion protection system comprising:

an edgebond structure for holding together glass fragment of a fractured faceplate, including:

a high tensile strength frame which surrounds said edge surface of said faceplate and which has a contour cor-



responding generally to that of said edge surface, i.e., a contour in which sides of the frame depart from and return to a plane connecting the four corners of the frame, the direction of said departure being the same as for the faceplate edge surface, and

a cement between said frame and said edge surface of said faceplate, said frame and said cement binding up said edge surface of said faceplate; and

a narrow strip crack retarder located about the circumference of said funnel and bonded thereto, said retarder being spaced axially rearwardly from said frame and in close adjacency thereto.

4,021,851

WRITING HEAD FOR FACSIMILE IMAGE REPRODUCTION

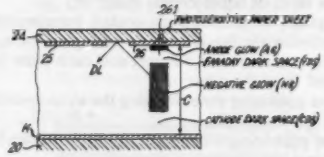
Emile F. Le Coquil, rue des Cordiers; Jean C. Amicel, Kerinou Rospez, and Jean-Pierre G. Martiniere, Les Fontaines, all of, Lannion, France (22300)

Filed June 20, 1975, Ser. No. 588,791

Claims priority, application France, July 8, 1974, 74.23685

Int. Cl.² H04N 1/24

U.S. Cl. 358—302 **5 Claims**



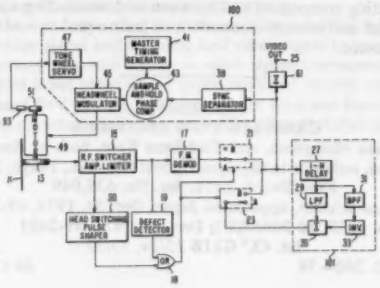
1. A writing head for printing aligned points on a light sensitive surface comprising a prismatic gastight enclosure formed by a first elongated rectangular isolating plate, by a second elongated rectangular isolating plate facing to said first plate at a predetermined distance and by an insulating spacer joining both plates, two metallic parallel first strips extending longitudinally on the internal surface of said first plate, each of said first strips having an external connection, one of said first strips being formed with a multiplicity of equidistant holes aligned along a longitudinal line and the other being non-perforated, the first plate being transparent at least in front of each hole, a multiplicity of second metallic parallel strips extending on the internal surface of the second plate transversally to the first strips and each passing in front on one of said

holes, each of said second strips having an external connection, said gastight enclosure containing a low pressure gas, so that when a voltage having appropriate level and sign is applied between the connection of one of said first strips and the connection of one of said second strips a glow discharge occurs between said strips and that when the said first strip is the holed strip the light of said discharge emerges from the corresponding hole through the first plate and acts on a light sensitive surface which is set against the external surface of said plate.

4,021,852
SIGNAL DEFECT COMPENSATION

Robert Norman Hurst, Cherry Hill, and Robert Adams Dischert, Burlington Township, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 21, 1975, Ser. No. 606,480
Int. Cl.² H04N *5/795*
U.S. Cl. 360—38 **6 Claims**



1. In a recorder-reproducer system for playback of a record medium of successive image representative video signals, said system including signal pickup means for recovering from said record medium, a signal having an instantaneous frequency representative of said successive images, said system further including synchronizing means for maintaining synchronism between said signal pickup means and said record medium, said synchronizing means further including selection means for selectively switching said signal pickup means and detecting means coupled to said pickup means, the combination comprising:

a video output terminal;

delay means providing between an input and an output terminal a signal delay of a time duration substantially corresponding to a period at the line frequency of said image representative video signals;

means for normally coupling the output signals of said detecting means to an input terminal of said delay means and to said video output terminal;

means for deriving a substitution signal from the output terminal of said delay means;

first sensing means responsive to the output signals derived from said signal pickup means for sensing abnormal conditions of signal recovery by said pickup means;

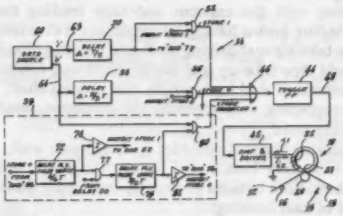
second sensing means responsive to signals derived from said selection means for sensing the switching of said signal pickup means; and

switching means responsive to the output of said first and said second sensing means for disabling said means for normally applying the output of said detecting means and concomitantly activating the application of said substitution signal to said video output terminal when said abnormal condition is sensed by said first sensing means or when said signal pickup means switching is sensed by said second sensing means.

4,021,853
METHOD AND APPARATUS FOR THE MAGNETIC STORAGE OF DIGITAL DATA

John V. Murphy, Norristown, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,810
Int. Cl.² G11B *5/09*
U.S. Cl. 360—44 **17 Claims**



1. In a digital data storge system wherein bits of binary data to be stored are sequentially applied to the system at intervals of time T, said system including a magnetic recording head disposed adjacent a magnetic storage medium for sequentially storing said bits as residual magnetic flux on a longitudinally extending track of said medium, the improved method for storing said data comprising the steps of:

establishing relative motion between said track and said recording head;

exciting said recording head for causing a single transition in the magnetic state of a segment of said track to occur during an interval T, said excitation occurring during the interval at a first predetermined time T_1 for storing a bit representative of a first binary character or, alternatively, at a second predetermined time T_2 during the interval for storing a bit representative of a second binary character;

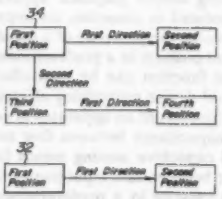
inhibiting excitation of said head during an interval when the transition therein would be spaced less than T from a transition in an immediately adjacent interval for establishing a minimum separation T_{min} equal to T between adjacent transitions; and

shifting excitation of said head from a predetermined time to an alternate time in an interval which is immediately adjacent an interval in which excitation is inhibit so as to limit the maximum separation T_{max} between adjacent transitions to a time less than 2T.

4,021,854
MINIATURE CASSETTE TAPE RECORDER

Shoichi Saito, No. 49, 2-Chome,, Minamidai, Nakano, Tokyo, Japan

Continuation of Ser. No. 593,865, July 7, 1975, abandoned, which is a continuation of Ser. No. 408,935, Oct. 23, 1973, abandoned. This application July 27, 1976, Ser. No. 709,192
Claims priority, application Japan, Oct. 20, 1972, 47-104955
Int. Cl.² G11B *5/008, 15/04, 15/18*
U.S. Cl. 360—62 **14 Claims**



1. A cassette tape recorder for magnetically recording an audio signal in a magnetic tape in a cassette and magnetically

reproducing audio signal recorded on the tape, particularly a miniature cassette tape recorded suitable for being operated by a single hand of a user and comprising:

1. a cassette receiving portion for holding the cassette in a predetermined position;
2. tape driving means for driving the tape in tape feeding and rewinding directions at a plurality of preselected speeds including a motor, a flywheel driven by the motor, a capstan coupled with the flywheel, a pinch roller cooperating with the capstan and tape feeding means and rewinding means having a tape supply reel driving shift, a tape take-up reel driving shaft and feeding tape by means of said tape take-up reel driving shaft and rewinding tape by means of said tape supply reel driving shaft;
3. A recording and reproducing magnetic head and an erasing head;
4. a housing for said recorder having a side wall;
5. A recording button and a recording and reproducing buttom, both buttons projecting outwardly from said side wall of said housing;
6. A chassis means for slidably mounting said buttons coaxially and adjacent each other, said chassis means mounting said recording and reproducing button for movement only in a first direction between a first and a second position and said recording button for movement in said first direction between a first and a second position as well as in a second direction perpendicular to said first direction between said first position and a third position and in said first direction between said third and fourth direction;
7. recording and reproducing circuit means having a recording and reproduction changeover switch to switch selectively operation between recording and reproducing operation; and
8. means connecting said two buttons and said circuit means including a third sliding plate secured to said recording and reproducing button, a recording and reproducing change-over lever and a rewind operating lever, whereby said circuit means is switched into a reproducing condition when both said recording and reproducing button and recording button are moved in said first direction from their first positions to their second positions and into a recording condition when only said recording button is moved in said second direction from its first position to its third position and then both said recording and reproducing button and said recording button are moved in said first direction with said recording and reproducing button being moved from its first position to its second position and said recording button being moved from its third position to its fourth position.

4,021,855

CASSETTE DETECTION DEVICE FOR RECORDING AND/OR PLAYBACK APPARATUS

Viktor Czonka, and Alois Patlik, both of Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

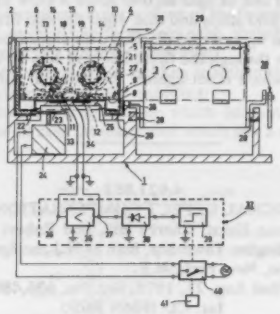
Filed July 7, 1975, Ser. No. 593,623

Claims priority, application Austria, July 17, 1974, 5929/74

Int. Cl.² G11B *15/68, 23/04, 23/36*

U.S. Cl. 360—69 **2 Claims**

1. In a recording and/or playback apparatus for record carriers accommodated in cassettes, an improved detection device for determining the presence of a cassette in the apparatus in the correct position in a predetermined location such that an apparatus function can be controlled in resonse to such presence, said device comprising electric circuit means for controlling a function of an apparatus in response to presence of a given capacitance between first and second input connections, and capacitive sensing means for applying said given capacitance between said input connections in response to presence of a cassette in a predetermined location, said sensing means comprising first and second electrodes connected respectively to said first and second input connections, and a cassette comprising an electrically conducting component arranged interiorally of the cassette, said conducting component and said electrodes arranged such that, said cassette being in said predetermined location, effective series



capacitance between said first electrode and said electrically conducting component and between said conducting component and said second electrode is at least equal to said given capacitance.

4,021,856

CASSETTE TAPE RECORDER

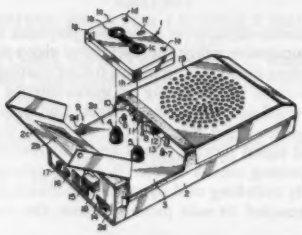
Kazuyasu Motoyama, and Toshikazu Kato, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1975, Ser. No. 638,949

Claims priority, application Japan, Dec. 24, 1974, 49-3292; Mar. 6, 1975, 50-30467[U]; Dec. 25, 1974, 49-2481

Int. Cl.² G11B *15/24, 15/32*

U.S. Cl. 360—74 **46 Claims**



1. A cassette tape recorder for use with a tape cassette internally housing a magnetic tape having its opposite ends secured to a pair of tape hubs which are rotatably dispoed within the cassette; the recorder comprising a tape end detecting lever having an arm on which a tape supply shaft is mounted for engagement with a tape supply hub, and pivotally mounted on a stationary base plate within the tape recorder for rocking motion under the tension in the tape when an end of the tape being fed is reached; an operation stop member pivotally mounted on another arm of the tape end detecting lever and having an abutment on its one end and a portion on its other end which unlocks a locking member for a playback actuating member; a pin fixedly mounted adjacent to the periphery of a flywheel which drives a capstan at uniform rate for cooperation with its associated pinch roller to feed the tape; and means for normally maintaining the tape end detecting lever at a given position in which the tape supply shaft is properly located relative to a tape take-up shaft, thereby maintaining the abutment of the operation stop member retracted from the path of rotation of the pin and maintaining said portion of the operation stop member away from the locking member, a rocking motion of the tape end detecting lever as the tape end is reached being effective to move the

abutment of the operation stop member into the path of rotation of the pin, which thereupon bears against the abutment to rock the operation stop member so that said portion thereof unlocks the locking member to reset the playback actuating member.

4,021,857

MAGNETIC RECORDING SYSTEM FOR REPRODUCING SUCCESSIVE STILL PICTURES

Hirozo Tanimura, 168, Hishiyanishi, Higashi-Osaka, Japan

Filed July 15, 1975, Ser. No. 596,013

Claims priority, application Japan, July 17, 1974, 49-82360

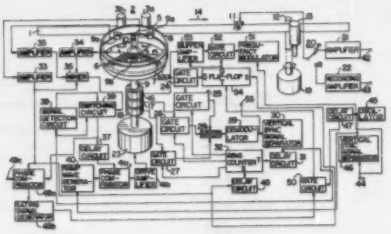
Int. Cl.² H04N *5/78;* **G11B** *5/52, 5/78, 15/52*

U.S. Cl. 360—84 **11 Claims**

1. In a magnetic recording system for recording an input video signal, said system including a rotary magnetic head drum assembly having a drum and a plurality of rotary magnetic heads spaced apart at a predetermined angular interval; motor drive means for driving a magnetic tape wound around the outer periphery of said drum in a predetermined direction at a predetermined speed, said magnetic tape being wound around the outer periphery of said drum in the shape of the character Ω, the improvement comprising:

video signal recording circuit means for receiving said input video signal and coupling said video signal to one of said rotary magnetic heads, a video signal corresponding to said input video signal being recorded on said magnetic tape field by field in the lengthwise direction thereof; and

motor control means for controlling the rotational phase of said rotary magnetic heads comprising first means coupled to said plurality of rotary magnetic heads for producing a first signal corresponding to a video signal previously recorded on said magnetic tape, second means for extracting a sync signal from said input video signal and producing a second signal, and phase comparator means



coupled to said first and second means and to said motor means for obtaining a signal corresponding to the difference in phase between said first and second signals for controlling said motor means so that each subsequently recorded video signal field is recorded on said magnetic tape in a record track portion having a fixed length.

DESIGN PATENTS

GRANTED MAY 3, 1977

ERRATA

For CLASS	See PATENT NO.
014–011	244,202
010–103	244,203
013–001	244,204
014–054	244,205
014–053	244,206
014–053	244,207
014–053	244,208
014–053	244,209
014–053	244,210
014–053	244,211
014–005	244,212
014–037	244,213
014–096	244,214
014–096	244,215
015–199	244,226
014–070	244,227
014–070	244,228
014–005	244,229
014–069	244,230
014–080	244,231
014–080	244,232
024–021	244,235

DESIGN PATENTS

GRANTED MAY 2, 1972

ERRATA

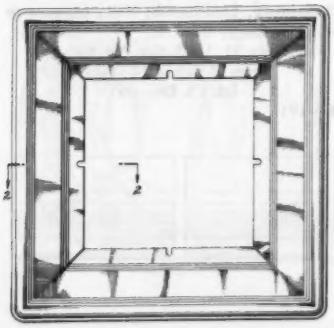
DESIGNS

MAY 3, 1977

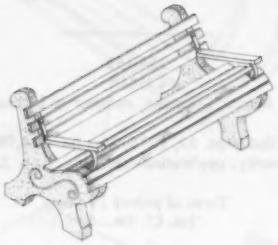
244,156
HEAD GARMENT
Gail Boyland, Newburgh, N.Y., assignor to Adco Service, Inc.
Filed Oct. 14, 1975, Ser. No. 621,880
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—239

244,157
TABLE TOP OR SIMILAR UNIT
Michael J. Beasley, 330 N. Pine, Chicago, Ill. 60644
Filed Apr. 28, 1975, Ser. No. 572,525
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—192

244,158
RECORD ALBUM FRAME
Carol Averill, 2251 Granada, Long Beach, Calif. 90815
Filed Jan. 16, 1976, Ser. No. 649,870
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—242



244,159
BENCH OR SIMILAR ARTICLE
Merion A. Sowers, 519 Robbins Ave., North Apollo, Pa. 15673
Filed May 9, 1975, Ser. No. 576,141
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—60



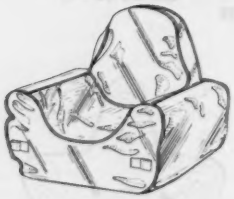
244,160
SEAT
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Feb. 17, 1976, Ser. No. 658,573
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

244,161
SEAT
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Feb. 17, 1976, Ser. No. 658,575
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

244,162
CHAIR
Karl Lübke, Rheda, Germany, assignor to Lübke KG, Rheda, Germany
Filed Sept. 19, 1975, Ser. No. 614,780
Claims priority, application Germany, Apr. 23, 1975, MR 772
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

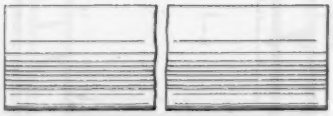
244,163
CHAIR
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Feb. 17, 1976, Ser. No. 658,691
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

244,164
ARM CHAIR
Rodney R. Haynes, Sr., Richmond, Va., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Oct. 9, 1975, Ser. No. 620,891
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



244,165
BUFFET
Alvin E. Palmer, 739 E. Scott St., Fresno, Calif. 93710
Filed July 31, 1975, Ser. No. 600,269
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—166

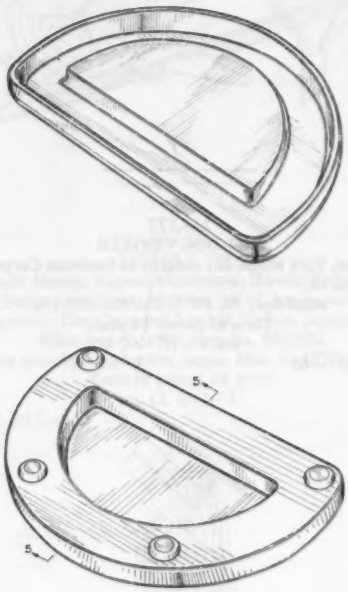
244,166
FURNITURE DECK EDGING
Roger A. Wittenberg, Thomasville, N.C., assignor to Flex-O-Lators, Inc., Carthage, Mo.
Filed July 31, 1975, Ser. No. 600,501
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



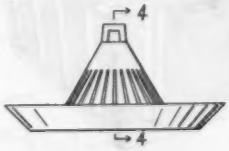
244,167
DRINKING GLASS
Jeanne M. McCormick, Columbus, Ohio, assignor to Federal Paper Board Company, Inc., Columbus, Ohio
Filed Mar. 31, 1976, Ser. No. 672,164
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5

244,168
PLATE
Julius Young, 2759 Mackintosh, Bloomfield Hills, Mich. 48013
Filed Aug. 25, 1975, Ser. No. 607,219
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—33

244,169
CUTTING BOARD OR THE LIKE
Frank Bernard Barnsley, Kidderminster, England, assignor to Formula Housing Research Limited, Birmingham, England
Filed Apr. 1, 1975, Ser. No. 564,051
Claims priority, application United Kingdom, Nov. 16, 1974, 968712/74
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—46

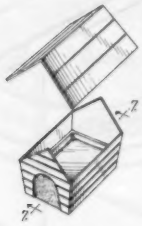


244,170
STRAINER
Thomas M. Pearce, Alabaster, Ala., assignor to Alabaster Industries, Alabaster, Ala.
Filed Aug. 27, 1975, Ser. No. 608,200
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—47

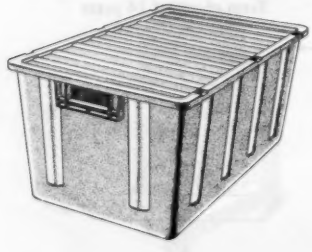


244,171
FUNNEL
Thomas M. Pearce, Alabaster, Ala., assignor to Alabaster Industries, Alabaster, Ala.
Filed Aug. 27, 1975, Ser. No. 608,199
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—68

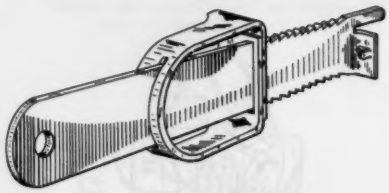
244,172
HOT DOG COOKER
Ernest Lee, Park Ridge, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Apr. 30, 1975, Ser. No. 573,196
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—85



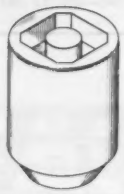
244,173
LAUNDRY BASKET
Paul G. Thurman, West Liberty, Ohio 43357
Filed July 7, 1975, Ser. No. 593,436
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—163



244,174
PORTABLE LOCK
Lawrence E. Sankey, 2905 Harmony, Amarillo, Tex. 79106
Filed May 14, 1976, Ser. No. 686,556
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—331

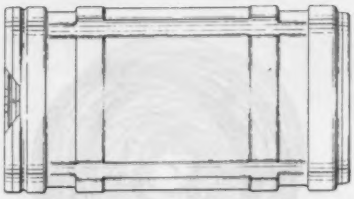


244,175
VEHICLE WHEEL LOCKING NUT
Yasuharu Fukuyama, Los Angeles, Calif., assignor to Fujita Industrial Co., Ltd., Santa Monica, Calif.
Filed Oct. 6, 1975, Ser. No. 619,705
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—397

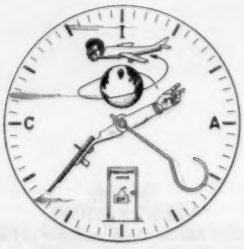


244,176
BOTTLE
John Pardo, Yonkers, N.Y., assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Sept. 12, 1974, Ser. No. 505,307
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—156

244,177
BARREL
Dennis H. Ward, 1, Garvock Drive, Kippington Road, Sevenoaks, Kent, England
Filed Oct. 15, 1975, Ser. No. 622,752
Claims priority, application United Kingdom, July 23, 1975, 971924/75
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—170

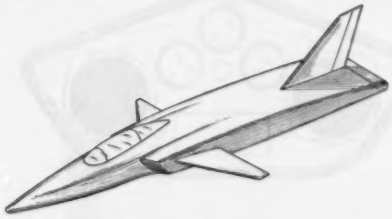


244,178
COMBINED DIAL AND HANDS FOR A TIMEPIECE
Frank D'Aiuto, 330 N. Terrace Ave., Mount Vernon, N.Y. 10550
Filed June 18, 1975, Ser. No. 588,058
Term of patent 7 years
Int. Cl. D10—*07*
U.S. Cl. D10—126



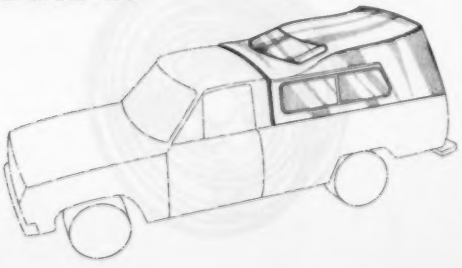
244,179
COMBINED DIAL AND HANDS FOR A TIMEPIECE
Frank D'Aiuto, 330 N. Terrace Ave., Mount Vernon, N.Y. 10550
Filed June 18, 1975, Ser. No. 588,059
Term of patent 7 years
Int. Cl. D10—*07*
U.S. Cl. D10—126

244,180
AIRCRAFT
Gordon Rosenthal, Jericho, N.Y., assignor to Fairchild Industries Inc., Germantown, Md.
Filed Nov. 3, 1975, Ser. No. 628,398
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—71

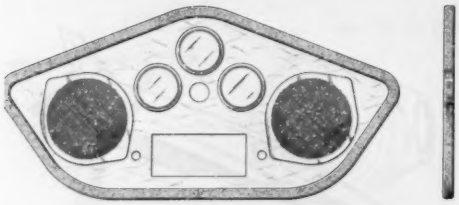


244,181
VEHICLE TIRE
Muneyoshi Maeda, Higashi-Murayama; Hiroshi Kojima, Hino, and Toshio Hayakawa, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed Aug. 7, 1975, Ser. No. 602,872
Claims priority, application Japan, Mar. 6, 1975, 50-8591
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142

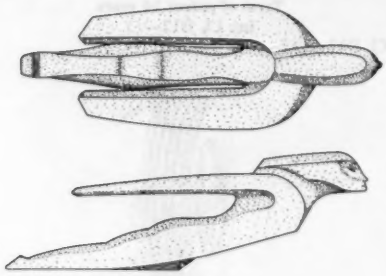
244,182
CAMPER SHELL
Wilbert L. Skidmore, Corona, and Howard C. Cole, Fullerton, both of Calif., assignors to Fiberglass in Motion, Inc., Norco, Calif.
Filed Dec. 29, 1975, Ser. No. 644,580
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156



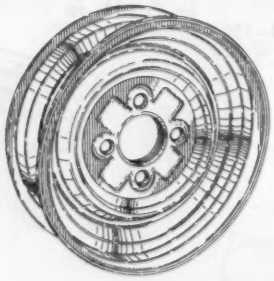
244,183
MOTORCYCLE DASH PANEL
Roy R. Gordon, 508 Lakelawn, Aurora, Ill. 60506
Filed May 3, 1976, Ser. No. 682,203
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—192



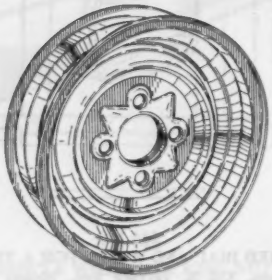
244,184
AUTOMOTIVE HOOD ORNAMENT
Gary R. Kubitskey, Livonia, Mich., assignor to Wisco Corporation, Ferndale, Mich.
Filed Apr. 23, 1976, Ser. No. 679,695
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—200



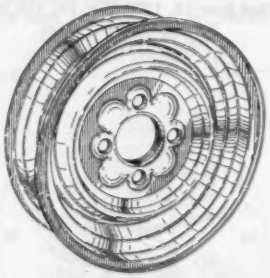
244,185
VEHICLE WHEEL
Eugene A. Mueller, Akron, Ohio, assignor to David L. Brennan and Richard M. Hamlin, both of Akron, Ohio
Filed Apr. 15, 1976, Ser. No. 677,393
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—212



244,186
VEHICLE WHEEL
Eugene A. Mueller, Akron, Ohio, assignor to David L. Brennan and Richard M. Hamlin, both of Akron, Ohio
Filed Apr. 15, 1976, Ser. No. 677,394
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—212

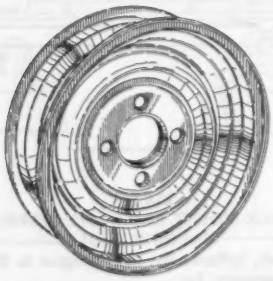


244,187
VEHICLE WHEEL
Eugene A. Mueller, Akron, Ohio, assignor to David L. Brennan and Richard M. Hamlin, both of Akron, Ohio
Filed Apr. 15, 1976, Ser. No. 677,395
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—212

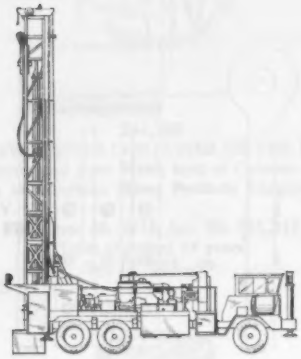


244,188
VEHICLE WHEEL
Eugene A. Mueller, Akron, Ohio, assignor to David L. Brennan and Richard M. Hamlin, both of Akron, Ohio
Filed Apr. 15, 1976, Ser. No. 677,488
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—212

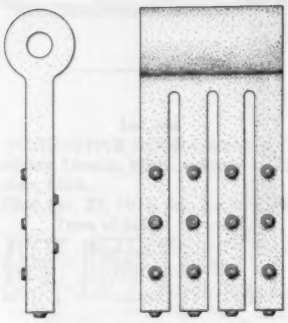
244,189
VEHICLE WHEEL
Eugene A. Mueller, Akron, Ohio, assignor to David L. Brennan and Richard M. Hamlin, both of Akron, Ohio
Filed Apr. 15, 1976, Ser. No. 677,489
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—212



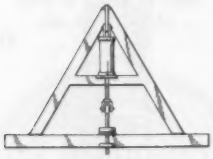
244,190
WELL DRILLING VEHICLE
Richard H. Swartz; Richard J. Pearce, and James M. Bowe, all of Gainesville, Fla., assignors to Driltech, Inc., Gainesville, Fla.
Filed Sept. 2, 1975, Ser. No. 609,849
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—21



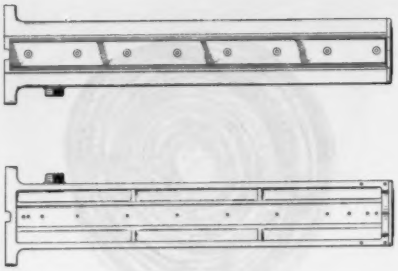
244,191
STUDDED, RUBBER CROP TOPPING FLAIL FOR USE ON SUGAR BEET HARVESTING MACHINE
John A. Diehl, Apt. 305, S. 2111 Jeff. Davis Highway, Arlington, Va. 22202
Filed May 29, 1975, Ser. No. 581,781
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—28



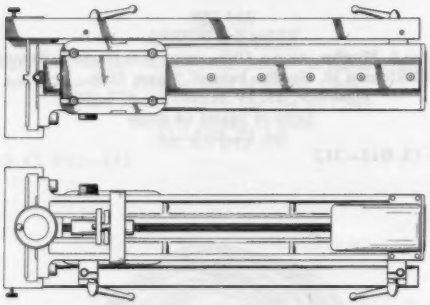
244,192
AGRICULTURAL IMPLEMENT HITCH
Clarence Ray Murray, Box 1227, Erick, Okla. 73645
Filed Feb. 27, 1976, Ser. No. 662,048
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—28



244,193
GAUGE CARRIAGE SUPPORT, GUIDEWAY AND DRIVE HOUSING FOR MACHINE TOOLS
Gerald V. Roch, Indianapolis, Ind., assignor to Hurco Manufacturing Company, Inc.
Filed Oct. 15, 1975, Ser. No. 622,668
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—123



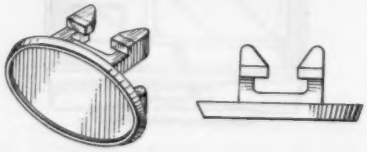
244,194
FRONT GAUGE MOUNT AND DRIVE ASSEMBLY FOR MACHINE TOOLS
Gerald V. Roch, Indianapolis, Ind., assignor to Hurco Manufacturing Company, Inc.
Filed Oct. 15, 1975, Ser. No. 622,667
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—123



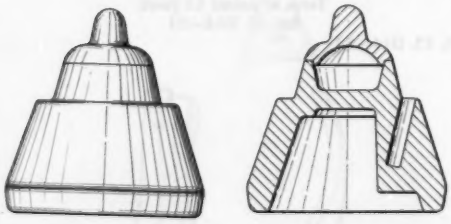
244,195
REAR GAUGE MOUNT AND DRIVE ASSEMBLY FOR MACHINE TOOLS
Gerald V. Roch, Indianapolis, Ind., assignor to Hurco Manufacturing Company, Inc.
Filed Oct. 15, 1975, Ser. No. 622,666
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—123

244,196
EYEGLASS FRAME
Hilde Zimmermann, Vienna, Austria, assignor to Christian Dior, S.A.R.L., Paris, France
Filed Oct. 14, 1975, Ser. No. 622,113
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

244,197
SIZE INDICATOR FOR A GARMENT HANGER
Henry D. Ostroll, Jackson Heights, N.Y., assignor to J. C. Penney Company, New York, N.Y.
Filed Feb. 7, 1975, Ser. No. 548,158
Term of patent 14 years
Int. Cl. D20—*99*
U.S. Cl. D19—13

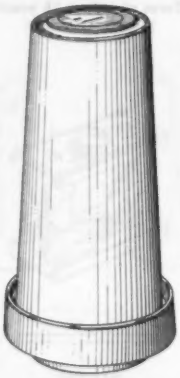


244,198
COMBINED PEN HOLDER AND INK STAND
Robert Kamensky, 2376 Rombold Road, Sharon, Pa. 16146
Filed Mar. 10, 1975, Ser. No. 556,890
Term of patent 7 years
Int. Cl. D19—*02*
U.S. Cl. D19—79

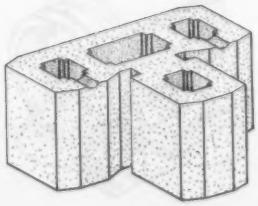


244,199
FREE-STANDING FIREPLACE
Lloyd L. Davis, P.O. Box 165, Jenkins, Minn. 56456
Filed Mar. 18, 1976, Ser. No. 667,886
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97

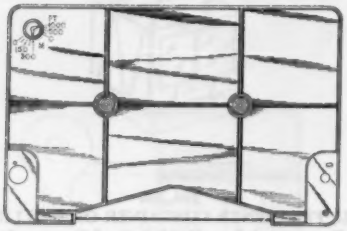
244,200
AIR FRESHENER CONTAINER OR THE LIKE
Jose R. Ramos, and Juan Wald, both of Caracas, Venezuela, assignors to American Home Products Corporation, New York, N.Y.
Filed June 30, 1976, Ser. No. 701,312
Term of patent 14 years
Int. Cl. D23—*99*
U.S. Cl. D23—150



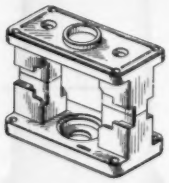
244,201
INTERLOCKING BUILDING BLOCK
George B. Muse, Hillcrest Drive, Calhoun, Ga. 30701
Continuation-in-part of Ser. No. 462,375, April 19, 1974. This application Feb. 10, 1975, Ser. No. 548,384
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—87



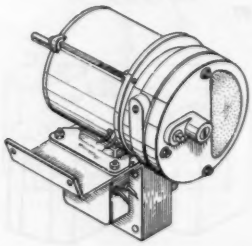
244,202
FILM-LOADED CARTRIDGE
Frank C. Corrado, Chili; Frederick W. Harvey, Webster; Richard R. Nedwidek, Gates, and Richard C. Neubauer, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Dec. 29, 1975, Ser. No. 645,114
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D14—11



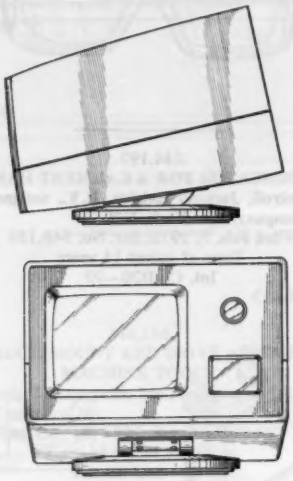
244,203
ANEMOMETER GENERATOR FRAME
R. A. Simerl, 528 Epping Forest Road, Annapolis, Md. 21401
Filed Sept. 18, 1975, Ser. No. 614,645
Term of patent 14 years
Int. Cl. D13—*01*
U.S. Cl. D10—103



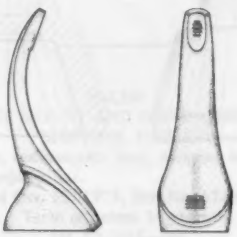
244,204
MOTOR-TRANSFORMER UNIT
Eugene C. Briggs, and William C. Wellbaum, both of Bowling Green, Ky., assignors to Koehring Company, Milwaukee, Wis.
Filed Feb. 11, 1976, Ser. No. 657,257
Term of patent 14 years
Int. Cl. D13—*01*
U.S. Cl. D13—1



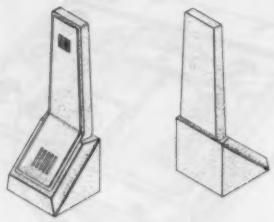
244,205
TERMINAL FOR A VIDEO TELEPHONE UNIT
Edward Edmund Benham, Greenwich; Walter A. Menn, Stamford, both of Conn.; Douglas M. Spranger, Brooklyn, and Malcolm J. Brookes, New York, both of N.Y., assignors to International Telephone and Telegraph Corporation, New York, N.Y.
Filed Feb. 18, 1975, Ser. No. 550,524
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—54



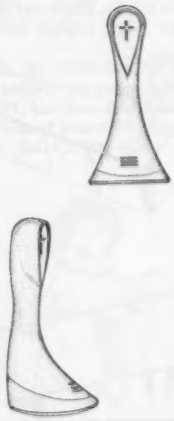
244,206
TELEPHONE
Peter P. Klepa, 3450 St. Susan Place, Los Angeles, Calif. 90066
Filed Sept. 16, 1975, Ser. No. 613,745
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



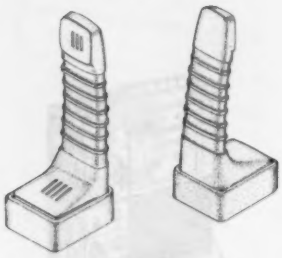
244,207
TELEPHONE
Robert P. Bliven, 5317½ La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 16, 1975, Ser. No. 613,933
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



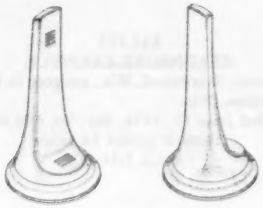
244,208
TELEPHONE
Robert P. Bliven, 5317½ La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 16, 1975, Ser. No. 613,934
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



244,209
TELEPHONE
Robert P. Bliven, 5317½ La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 16, 1975, Ser. No. 613,935
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



244,210
TELEPHONE
Robert P. Bliven, 5317½ La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 18, 1975, Ser. No. 614,488
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

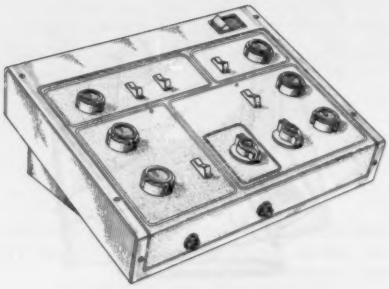


244,211
TELEPHONE
Robert P. Bliven, 5317½ La Cresta Court, Los Angeles, Calif. 90038
Filed Sept. 16, 1975, Ser. No. 613,748
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53

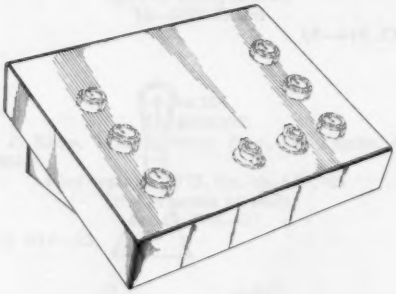
244,212
COMBINED TAPE RECORDER AND RADIO RECEIVER
Yoichi Hisano, Neyagawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Apr. 16, 1975, Ser. No. 568,758
Claims priority, application Japan, Oct. 18, 1974, 49-36613
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—5

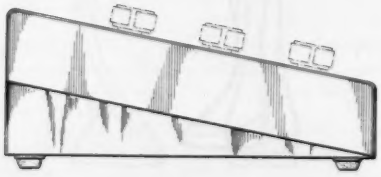
244,213
HEADPHONE EARPIECE
Joseph C. Besasie, Shorewood, Wis., assignor to Koss Corporation, Milwaukee, Wis.
Filed June 11, 1976, Ser. No. 694,981
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—37

244,214
ELECTRONIC MUSICAL ACCESSORY
Herbert Ross, Bronx, N.Y., and Michael L. Beigel, Glenwood, N.J., assignors to Musitronics Corporation, Rosemont, N.J.
Filed Jan. 16, 1976, Ser. No. 649,738
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96

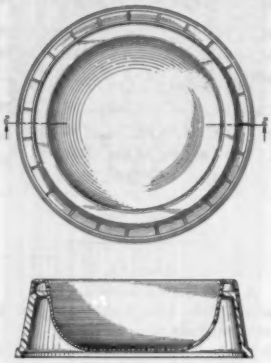


244,215
HOUSING FOR SOUND MODIFIER OR THE LIKE
Herbert Ross, Bronx, N.Y., assignor to Musitronics Corporation, Rosemont, N.J.
Filed Jan. 16, 1976, Ser. No. 649,737
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D14—96





244,216
PET FEEDING DISH
William C. Gerber, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed July 25, 1975, Ser. No. 599,124
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—16



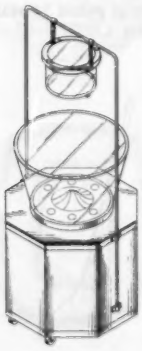
244,217
DOLL OR SIMILAR ARTICLE
Dolores Wycalis, 2360 Sandra Road, Palm Springs, Calif. 92262
Filed Sept. 15, 1975, Ser. No. 613,276
The portion of the term of this patent subsequent to Feb. 1, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

244,218
DOLL
Jo Raviscioni, 24433 Ave. 14, Madera, Calif. 93637
Filed Oct. 10, 1975, Ser. No. 621,498
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

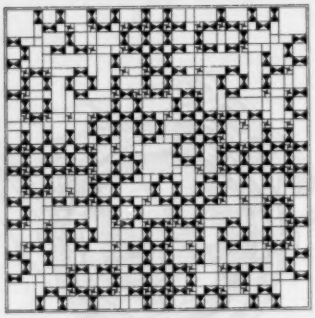
244,219
HOCKEY STICK
Roger J. Poirier, 2965 Carling Ave., Ottawa, Ontario, Canada (K2B 7J9)
Filed July 17, 1975, Ser. No. 596,746
Claims priority, application Canada, May 9, 1975, 0905751
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 BC

244,220
HOCKEY STICK
Robert J. De brey, Minneapolis, Minn., assignor to The Northland Group, Inc., Chaska, Minn.
Filed Oct. 17, 1975, Ser. No. 623,465
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 BC

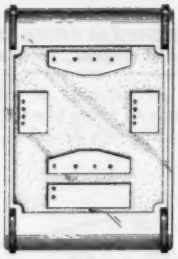
244,221
AMUSEMENT APPARATUS
Joseph Benjamin Garto, 2240 E. 8th St., Brooklyn, N.Y. 11223, and Anthony Garto, 2075 Shore Parkway, Brooklyn, N.Y. 11214
Filed Oct. 10, 1975, Ser. No. 621,286
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J



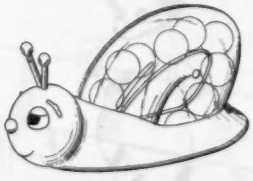
244,222
GAME BOARD
Gerald A. Schreiber, 8148 NW. 27th, Bethany, Okla. 73008
Filed Apr. 9, 1975, Ser. No. 566,178
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



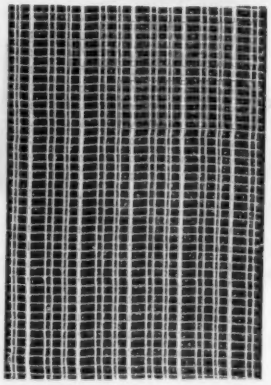
244,223
CARD GAME SIMULATOR
George F. Kucera, Palo Alto, Calif., assignor to Bridge-O-Matic Corporation, Palo Alto, Calif.
Filed Oct. 17, 1975, Ser. No. 622,971
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 A



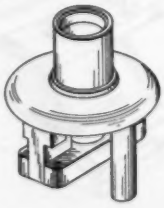
244,224
ANIMAL FIGURE TOY
Joseph M. McClary, Rte. 1, Crocket Road, Brentwood, Tenn. 37027
Filed July 23, 1975, Ser. No. 596,561
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 B



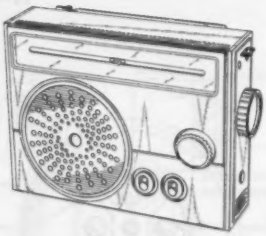
244,225
CURTAIN MATERIAL
Peter E. Schroeder, Am Falter 8, CH866 Lucerne, Switzerland
Filed July 22, 1975, Ser. No. 598,074
Claims priority, application Germany, Feb. 1, 1975, 76
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E



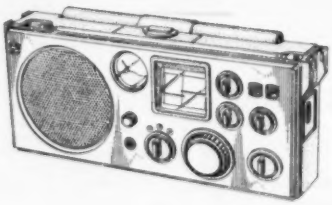
244,226
COMBINED TOP SENDER AND BEARING PLATE FOR AN ANEMOMETER
R. A. Simerl, 528 Epping Forest Road, Annapolis, Md. 21401
Filed Sept. 18, 1975, Ser. No. 614,646
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199



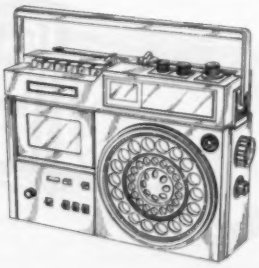
244,227
PORTABLE RADIO
Keizo Kushida, Moriguchi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed May 5, 1975, Ser. No. 574,486
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—70



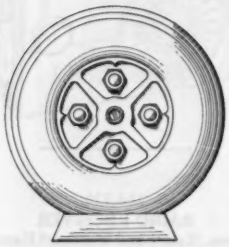
244,228
RADIO RECEIVER
Takeyoshi Kawano, Kyoto, and Masanori Hamada, Moriguchi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed May 7, 1975, Ser. No. 575,294
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—70



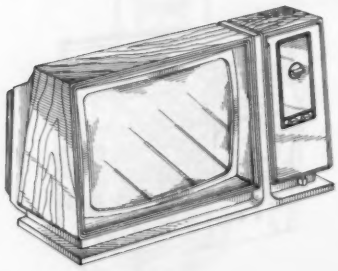
244,229
COMBINED RADIO RECEIVER AND TAPE RECORDER
Shuhei Taguchi, Moriguchi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed May 5, 1975, Ser. No. 575,562
Term of patent 14 years
Int. Cl. D14—*03, 01*
U.S. Cl. D14—5



244,230
RADIO
Roland J. Susich, Malibu, Calif., assignor to Hiraoka Los Angeles, Inc., Los Angeles, Calif.
Filed Feb. 24, 1975, Ser. No. 552,705
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—69

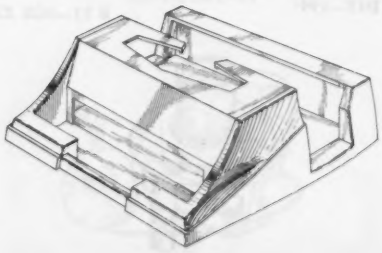


244,231
TELEVISION RECEIVER
Richard K. Althans, Long Grove, and Melvin H. Boldt, Glenview, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.
Filed Aug. 1, 1975, Ser. No. 600,987
Term of patent 7 years
Int. Cl. D14—*03*
U.S. Cl. D14—80

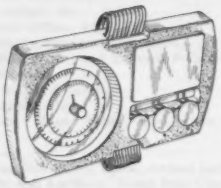


244,232
TELEVISION RECEIVER
Robert W. Becker, Naperville; Melvin H. Boldt, Glenview, and David P. Chuboff, North Barrington, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.
Filed Sept. 8, 1975, Ser. No. 611,456
Term of patent 7 years
Int. Cl. D14—*03*
U.S. Cl. D14—80

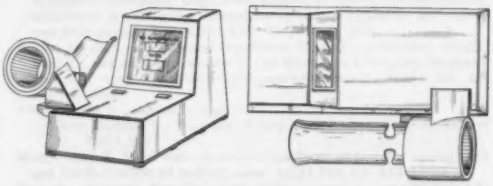
244,233
TYPEWRITER CASING
Shigeaki Kuramochi, 24-17 5 chome, Koishikawa Bunkyo, Tokyo, Japan
Filed Apr. 30, 1975, Ser. No. 573,119
Claims priority, application Japan, Nov. 8, 1974, 49-039140
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 A



244,234
MILEAGE CALCULATOR
Alwin J. Stahel, New Brighton, Minn., assignor to Arthur Salm, Inc.
Filed July 16, 1975, Ser. No. 596,105
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D64—11 B



244,235
AUTOMATIC BLOOD PRESSURE MEASURING APPARATUS
Abraham Lichowsky, Los Angeles, Calif., assignor to Medical Monitors, Inc., Los Angeles, Calif.
Filed Sept. 2, 1975, Ser. No. 609,203
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—21



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 3RD DAY OF MAY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Osakeyhtio: *See*—
Reiner, Per Lennart, 4,021,296.

A. B. Dick Company: *See*—
Tauszig, Julio G., 4,021,605.

A. F. Hydraulics Limited: *See*—
Reynolds, Lionel Arthur, 4,020,747.

A. H. Robins Company, Incorporated: *See*—
Welstead, William J., Jr.; and Boswell, Robert F., Jr., 4,021,552.

A-1 Engineering, Inc.: *See*—
Neuman, Clayton L., 4,021,515.

AB Akerlund & Rausing: *See*—
Benzon-Petersen, Boye Ditlef; and Lorant, Istvan Stefan, 4,020,618.

AB Ferrosan: *See*—
Hernestam, Sven Erik Harry; Bjork, Anders Karl Konrad; Abramo, Aina Lisbeth; and Kjellberg, Bengt Erik Sigvard, 4,021,564.

AB Gotaverken: *See*—
Karlsson, Kurt; and Lundberg, Thorsten, 4,021,011.

AB Piab: *See*—
Tell, Hans Peter, 4,021,164.

AB Siwertell: *See*—
Eklof, Karl Vilhelm Evert; and Tingskog, Karl August Lennart, 4,020,953.

Abbott, John D. Retractable transit coach step. 4,020,920, Cl. 182-19.000.

Abbott Laboratories: *See*—
McKay, Gene Darrell, 4,021,543.

Abdel-Monem, Mahmoud M., to Zinpro Corporation. Method of nutritional supplementation for zinc and methionine by ingesting 1:1 zinc methionine complexes. 4,021,569, Cl. 424-289.000.

Abex Corporation: *See*—
Beetle, Robert H., 4,020,928.

Abramo, Aina Lisbeth: *See*—
Hernestam, Sven Erik Harry; Bjork, Anders Karl Konrad; Abramo, Aina Lisbeth; and Kjellberg, Bengt Erik Sigvard, 4,021,564.

Acroform: *See*—
Miller, Jack V., 4,021,012.

Adachi, Keiichi: *See*—
Shiba, Keisuke; Nakazyo, Kiyoshi; Ohi, Reiichi; and Adachi, Keiichi, 4,021,248.

Adam, Karl; and Haarer, Erich, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Production of 2-ethylhexanol-(1) by hydrogenation of 2-ethylhexen-(2)-al-(1). 4,021,497, Cl. 260-638.00B.

Adams, Dora E., administratrix: *See*—
Bachman, Paul L.; and Adams, John S., Jr., deceased, 4,021,246.

Adams, Ernest E. Third member handling jack. 4,021,017, Cl. 254-8.00B.

Adams, John S., Jr., deceased: *See*—
Bachman, Paul L.; and Adams, John S., Jr., deceased, 4,021,246.

Adler, Ralph P. I., to Brunswick Corporation. Melt spinning process and machine. 4,020,891, Cl. 164-82.000.

Adler, Robert J.: *See*—
Samuels, W. Edward; and Adler, Robert J., 4,020,690.

Adler, Stanford L., to Technicon Instruments Corporation. Blood collecting syringe. 4,020,831, Cl. 128-2.00F.

Aerojet-General Corporation: *See*—
Standart, Melvin W.; and Spargo, William E., 4,021,363.

Aeronutronic Ford Corporation: *See*—
Kaufman, Warren F., 4,021,512.

Afco Products Incorporated: *See*—
Klancnik, John H., 4,021,809.

Agbabian Associates: *See*—
Safford, Frederick B., 4,020,672.

Agency of Industrial Science & Technology: *See*—
Kataoka, Shoei; Komamiya, Yasuo; Kawashima, Mitsuo; Hashizume, Nobuo; and Tomizawa, Kazutaka, 4,021,680.

AGFA-Gevaert, A.G.: *See*—
Pfeifer, Josef; Rheude, Alfred; Thate, Kurt; and Muller, Jurgen, 4,021,668.
Zindikus, Walter; Krobel, Heinz; and Franke, Walter, 4,021,113.

AGFA-GEVAERT N.V.: *See*—
Pira, Francois Jean; and Van Wijk, Jozef Carolus, 4,021,179.
Van Wijnsberghe, Leo August; and Van Poucke, Raphael Karel, 4,021,445.

Agri-Industries of South Dakota: *See*—
Heiser, Jerome Jacob, 4,021,074.

Ahlgren, Frederic F.; and Scott, Paul F., to United States of America, Energy Research and Development Administration. Acoustic transducer for nuclear reactor monitoring. 4,020,693, Cl. 73-339.00A.

Ahrens, Gunter; Hesse, Hans Hermann; Beierfuss, Gunter; and Wagner, Erich, to Kabel-und Metallwerke Gutenhoffnungshutte Aktiengesellschaft. Clamp for waveguides, cable or the like. 4,020,531, Cl. 24-284.000.

Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, to Schering Aktiengesellschaft. Thiophene derivatives and their preparation. 4,021,450, Cl. 260-332.20A.

Aiken, Howard H., deceased (by Aiken, Mary E., executrix); Bailey, Paul T.; and Minnick, Robert C., to Monsanto Company. Mutually exclusive magnetic bubble propagation circuits. 4,021,790, Cl. 340-174.0TF.

Aiken, Mary E., executrix: *See*—
Aiken, Howard H., deceased; Bailey, Paul T.; and Minnick, Robert C., 4,021,790.

Aine, Harry E. Solid state pressure transducer of the leaf spring type and batch method of making same. 4,021,766, Cl. 338-2.000.

Airaudo, Antonin. Portable earth drilling apparatus. 4,020,909, Cl. 173-147.000.

Airpax Electronics Incorporated: *See*—
Carlson, Peter J., 4,021,794.

Ajinomoto Co., Inc.: *See*—
Takemoto, Tadashi; Kakizaki, Fusayoshi; Ariyoshi, Yasuo; and Noda, Ichiro, 4,021,418.

Akeson, Walter R.: *See*—
Freytag, Arthur H.; and Akeson, Walter R., 4,021,231.

Akiba, Kosuke, to Sony Corporation. Waveguide elements. 4,020,875, Cl. 138-128.000.

Akiyama, Satoshi: *See*—
Mizuno, Hitoshi; and Akiyama, Satoshi, 4,020,552.

Aktiebolaget Carl Munters: *See*—
Norback, Per, 4,021,282.
Vangbo, Hakan, 4,021,590.

Aktiebolaget Electrolux: *See*—
Johansson, Erik Karl Gustav, 4,020,526.

Aktieselskabet Volund: *See*—
Blach, Evald, 4,020,773.

Alexander, Thomas E., to Cold Spring Granite Company. Anchor for stone building member. 4,020,610, Cl. 52-511.000.

Alexanderson, Verner; Trecek, James Bryant; and Vanderwaart, Cornelius Marsden, to American Cyanamid Company. Adiabatic process for nitration of nitratable aromatic compounds. 4,021,498, Cl. 260-645.000.

Allaire, Roger: *See*—
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,020,983.

Allen, Harvey D. Auxilliary fluid power system. 4,020,638, Cl. 60-718.000.

Allen, Linus S., to Mobil Oil Corporation. Neutron-neutron logging for both porosity and macroscopic absorption cross section. 4,021,666, Cl. 250-265.000.

Allied Chemical Corporation: *See*—
Gancy, Alan B.; and Poncha, Rustom P., 4,021,526.
Poncha, Rustom P., 4,021,525.

Almen, Torsten; Haavaldsen, Johan; and Nordal, Vegard, to Nyegaard & Co. A/S. Amido derivatives of 2,4,6-triiodobenzoic acids containing at least one N-hydroxyalkyl and at least two hydroxyl groups. 4,021,481, Cl. 260-558.00A.

Alsberg, Dietrich Anselm, to Bell Telephone Laboratories, Incorporated. Waveguide fault location system. 4,021,731, Cl. 324-52.000.

Aluminum Company of America: *See*—
Binger, Wayne W.; Collins, John W., III; Fahnestock, Melvin R.; and Stuppy, George H., 4,020,992.
Knapp, Lester L.; and Miller, Gene S., 4,021,317.

Amano, Yoshifumi, to Sony Corporation. Video display system employing drive pulse of variable amplitude and width. 4,021,607, Cl. 358-230.000.

Amazonen-Werke H. Dreyer: *See*—
Dreyer, Heinz, 4,020,991.

Amberg, Stephen W., to Owens-Illinois, Inc. Apparatus for producing shrunken pilfer-proof neck labels for containers. 4,021,285, Cl. 156-446.000.

Amberg, Stephen W., to Owens-Illinois, Inc. Apparatus for producing shrunken pilfer-proof neck labels for containers. 4,021,286, Cl. 156-446.000.

Amchem Products, Inc.: *See*—
Cooke, Anson Richard; Long, John Whitney; and Wiedman, Steven John, 4,021,230.

American Can Company: *See*—
Banczak, Daniel Philip; and Tan, William Eric, 4,021,252.
Grimsley, Arvid Kjellsen, 4,021,524.

American Chain & Cable Company, Inc.: *See*—
McCoy, Frank L.; and King, Earl R., 4,020,894.

American Colloid Company: *See—*
Clem, Arthur G., 4,021,402.
American Color & Chemical Corporation: *See—*
Michalowicz, William, 4,021,487.
American Cyanamid Company: *See—*
Alexanderson, Verner; Trecek, James Bryant; and Vanderwaart, Cornelius Marsden, 4,021,498.
Cross, Barrington; Grasso, Charles Paul; and Walworth, Bryant Leonidas, 4,021,227.
Floyd, Middleton Brawner, Jr., 4,021,452.
Giglia, Robert Domenico, 4,021,100.
Lutz, Albert William; and Diehl, Robert Eugene, 4,021,483.
Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, 4,021,544.
Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, 4,021,545.
Tucker, Robert Jerome; and Greenwood, Ruth, 4,021,405.
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Shozo, 4,021,196.
Wang, Samuel S., 4,021,505.
American Hoist & Derrick Company: *See—*
Crook, Edward J., Jr., 4,021,130.
American Home Products Corporation: *See—*
Dobson, Thomas A.; Humber, Leslie G.; Demerson, Christopher A.; and Jirkovsky, Ivo L., 4,021,451.
Yardley, John P., 4,021,560.
American Hospital Supply Corporation: *See—*
Rockett, Thomas J.; Tiffany, John S.; and O'Connell, John J., 4,020,557.
American Technical Ceramics, Division of Phase Industries, Inc.: *See—*
Insetta, Victor; and Seaman, Harry V., 4,021,708.
Americhem, Inc.: *See—*
Satterfield, John J., III; and Swain, Kenneth E., 4,021,022.
AMF Incorporated: *See—*
Patel, Bahechar S., 4,021,719.
Amicel, Jean C.: *See—*
Le Coquil, Emile F.; Amicel, Jean C.; and Martiniere, Jean-Pierre G., 4,021,851.
Amos, Alvin C., to Kaiser Aluminum & Chemical Corporation. Wall assembly. 4,020,611, Cl. 52-584.000.
AMP Incorporated: *See—*
Casciotti, Albert; and Hall, Leslie Carl, Jr., 4,020,540.
Dola, Frank Peter; and Rossler, Frederick William, Jr., 4,021,604.
Kinkaid, Robert John; and Asick, John Carl, 4,021,095.
Amsler, Joachim, to Sprecher & Schuh AG. Arc electrode, especially for a contact arrangement in a vacuum switch. 4,021,629, Cl. 200-144.00B.
Anchor Hocking Corporation: *See—*
Nixdorff, Frank S., 4,020,981.
Andersen, Heinz-Erhardt; and Stangl, Georg, to Hoechst Aktiengesellschaft. Extruder with blow head. 4,021,170, Cl. 425-72.00R.
Anderson, Erland D.; Paulson, David S.; and Sullivan, Bruce M., to Donaldson Company, Inc. Air cleaner with restriction indicator. 4,020,783, Cl. 116-114.0PV.
Anderson, Mark O., to Halliburton Company. Snap-lock end ring. 4,021,083, Cl. 308-4.00A.
Ando, Koki, to Nissin Shokuhin Kaisha, Ltd. Lid of a receptacle for instant cooking food. 4,020,969, Cl. 220-265.000.
Andrews, Austin M., II; Clarke, John E.; Gertner, Edward R.; Longo, Joseph T.; and Eden, Richard C., to United States of America, Air Force. Inverted heterojunction photodiode. 4,021,836, Cl. 357-30.000.
Angelov, Todor Dimitrov: *See—*
Slavinski, Ivan Assenov; Angelov, Todor Dimitrov; Vukolov, Dmitri Dmitrievich; Burgudjiev, Eduard Todorov; and Komitovski, Mihail Dimitrov, 4,020,545.
Anhalt, John William; and Curley, James Harvey, to International Telephone and Telegraph Corporation. Zero force printed circuit board connector. 4,021,091, Cl. 339-75.0MP.
Anolick, Colin; and Covington, Robert Allen, Jr., to Du Pont de Nemours, E. I., and Company. Slurry polymerization process. 4,021,600, Cl. 528-484.000.
Anthony, Thomas R.; Chang, Mike F.; and Cline, Harvey E., to General Electric Company. Post diffusion after temperature gradient zone melting. 4,021,269, Cl. 148-1.500.
Aoshika, Masayuki: *See—*
Nanjyo, Toshio; and Aoshika, Masayuki, 4,021,603.
Aotani, Seiji: *See—*
Komatsu, Koei; Harada, Kunihiro; Aotani, Seiji; and Itabashi, Akio, 4,021,259.
Aoyama, Shunichi; and Hayashi, Yoshimasa, to Nissan Motor Co., Ltd. Hydraulic valve lifter for internal combustion engine. 4,020,806, Cl. 123-90.550.
Aqua-Chem, Inc.: *See—*
La Haye, Paul G., 4,021,191.
Arai, Atsuaki: *See—*
Furutachi, Nobuo; and Arai, Atsuaki, 4,021,428.
Hayashi, Jun; Kato, Takeshi; and Arai, Atsuaki, 4,021,238.
Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha: *See—*
Toda, Hiromi; Kunimori, Kametaro; and Tsumori, Kuniaki, 4,021,484.
Arave, Alvin E., to United States of America, Energy Research and Development Administration. Ultrasonic thermometer isolation standoffs. 4,020,692, Cl. 73-339.00A.
Arcamone, Federico; and Cassinelli, Giuseppe, to Societa' Farmaceutici Italia S.p.A. Paromomycin derivatives and process for the preparation thereof. 4,021,601, Cl. 536-17.000.
ARCO Medical Products Company: *See—*
Walters, Robert A.; and Hirtz, Russell E., 4,021,736.
Arden, Sidney, to Consolidated Foods Corporation. Fruit-flavored frozen confection and method of making the same. 4,021,583, Cl. 426-134.000.
Ardis, Alan E.; and Katz, Lawrence E., to Olin Corporation. Method for drying coatings. 4,021,261, Cl. 106-264.000.
Ariyoshi, Yasuo: *See—*
Takemoto, Tadashi; Kakizaki, Fusayoshi; Ariyoshi, Yasuo; and Noda, Ichiro, 4,021,418.
Armour and Company: *See—*
Smithers, James P., 4,020,614.
Armour Pharmaceutical Company: *See—*
Gilman, William S.; Jones, John L.; and Rubino, Andrew M., 4,021,398.
Rubino, Andrew M., 4,021,536.
Arndt, Friedrich Karl, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Hydraulically operable linear motor. 4,020,746, Cl. 91-291.000.
Arneklev, Duane R.; and Baker, Don R., to Stauffer Chemical Company. Sulfide herbicide antidote compositions and method of use. 4,021,228, Cl. 71-96.000.
Arneklev, Duane R.; and Baker, Don R., to Stauffer Chemical Company. Sulfonamide herbicide antidote compositions and method of use. 4,021,229, Cl. 71-100.000.
Arneklev, Duane R.: *See—*
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,021,224.
Arnold Engineering Company: *See—*
Handren, Ralph M.; and McKay, John P., 4,021,273.
Arnold, Fred E., to United States of America, Air Force. Thermally stable benzimidazonaphthyridine compositions. 4,021,409, Cl. 260-47.0CP.
Arnold, Hanfried; Hilscher, Jean-Claude; and Wieske, Reinhold, to Schering Aktiengesellschaft. Process for the preparation of 3-hemisulfate-17α-hydroxy steroids. 4,021,458, Cl. 260-397.500.
Arthur D. Little, Inc.: *See—*
Van Vloten, Curtis P., 4,021,818.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Nonaka, Kohei; and Sudo, Michio, 4,021,767.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Kanno, Kyusei, 4,021,830.
Miyata, Katsuhiko, 4,021,823.
Asai, Yoshiteru; and Yoshizoe, Sumio, to Hitachi Metals, Ltd. Method of isothermal annealing of band steels for tools and razor blades. 4,021,272, Cl. 148-15.000.
Asakura, Kensuke. Method and apparatus for the destruction of an upper portion of a structure. 4,021,638, Cl. 219-200.000.
Asam, Adolf R.; and Balkwill, John T., to International Telephone and Telegraph Corporation. Method for making strip microchannel electron multiplier array. 4,021,216, Cl. 65-4.00B.
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, to Canadian Lady-Canadelle Inc. Apparatus for joining a buckle to a tape. 4,020,983, Cl. 223-49.000.
Ashimori Kogyo Kabushiki Kaisha (Ashimori Industry Co., Ltd.): *See—*
Hyodo, Masakatsu; and Inoue, Hitoshi, 4,020,790.
Asick, John Carl: *See—*
Kinkaid, Robert John; and Asick, John Carl, 4,021,095.
Asmundsson, Einar; and Grosso, Donald S., to Teleco Inc. Borehole sensor. 4,021,774, Cl. 340-18.00R.
Aspro, Incorporated: *See—*
St. John, Richard C., 4,020,936.
Astor-Werk Otto Berning & Co., Firma: *See—*
Klette, Guenter, 4,020,529.
Atlantic Richfield Company: *See—*
Frisch, Kurt Charles; and Russell, Donald Henry, 4,021,378.
Atwood, John G.; and Demey, Charles F., II, to Perkin-Elmer Corporation, The. Heat exchanger for analysis apparatus. 4,021,123, Cl. 356-244.000.
Aubin, Bernard: *See—*
Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, 4,021,207.
Auclair, Roland A.: *See—*
Auclair, Roland G.; and Auclair, Roland A., 4,021,033.
Auclair, Roland G.; and Auclair, Roland A. Skating aid. 4,021,033, Cl. 272-70.300.
Auld, Bert A., to Thomson-CSF. Surface elastic wave memory correlator. 4,021,657, Cl. 235-181.000.
Austel, Volkard: *See—*
Kutter, Eberhard; Austel, Volkard; Eberlein, Wolfgang; and Heider, Joachim, 4,021,558.
Austen, K. Frank: *See—*
Goetzl, Edward J.; and Austen, K. Frank, 4,021,387.
Austill, Robert J., to FMC Corporation. Roof for railway car. 4,020,603, Cl. 52-53.000.
Austin, Arthur L.; Levis, William W., Jr.; and Patton, John T., Jr., to BASF Wyandotte Corporation. Polyurethane foams resistant to discoloration. 4,021,385, Cl. 260-2.5BB.
Automatic Parking Devices, Inc.: *See—*
Dreslinski, Daniel M., 4,021,644.
Automatic Switch Company: *See—*
Moakler, William A.; and Stotz, Charles, 4,021,678.
Automation Industries, Inc.: *See—*
Barry, Peter S., 4,020,679.

Automatisation-Sogemo: *See—*
Mariaulle, Claude, 4,021,062.
Automobiles Peugeot: *See—*
Malphettes, Jean; and Fontanet, Pierre, 4,020,859.
Automotive Products Company Limited: *See—*
Joynes, Brian; and Bainbridge, Wilfred Nicholas, 4,020,635.
AutoSystems Limited: *See—*
Brook, Richard Morley; and Elliot, Eric, 4,021,336.
Avery International Corporation: *See—*
Richman, Edward B.; Tomlinson, Seymour W.; Nemeth, Suzette; and Wilson, David W., 4,020,842.
B. F. Goodrich Company, The: *See—*
Shah, Pravin K., 4,021,397.
B & J Machinery Co., Inc.: *See—*
Morrison, Johnny Randall, 4,020,793.
Baadsgaard, Marinus J., to Intermountain Research and Development Corporation. Production of sodium carbonate. 4,021,527, Cl. 423-206.00T.
Bachman, Paul L.; and Adams, John S., Jr., deceased (by Adams, Dora E., administratrix), to Horizons Incorporated, a division of Horizons Research Incorporated. Free radical photosensitive compositions containing bis-sulfides or sulfinyl esters as antifoggants. 4,021,246, Cl. 96-67.000.
Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Adam, Karl; and Haarer, Erich, 4,021,497.
Goetz, Norbert; and Fischer, Roman, 4,021,411.
Baggiolini, Enrico; Partridge, John Joseph, Jr.; and Uskokovic', Milan Radoje, to Hoffmann-La Roche Inc. Syntheses of 24R,25- and 24S,25-dihydroxycholecalciferol. 4,021,423, Cl. 260-239.55D.
Bailey, Fay W., to Phillips Petroleum Company. Polyarylene sulfide resin alloys. 4,021,596, Cl. 428-375.000.
Bailey, Kenneth E., to FMC Corporation. Diesel pile hammer with vent for starting. 4,020,804, Cl. 123-46.00R.
Bailey, Paul T.: *See—*
Aiken, Howard H., deceased; Bailey, Paul T.; and Minnick, Robert C., 4,021,790.
Bainbridge, Wilfred Nicholas: *See—*
Joynes, Brian; and Bainbridge, Wilfred Nicholas, 4,020,635.
Bajer, Francis J.: *See—*
Pawlak, Joseph A.; and Bajer, Francis J., 4,021,474.
Bajulaz, Roger. Spherical piston machine. 4,021,158, Cl. 418-52.000.
Baker, Don R., to Stauffer Chemical Company. Organotin miticidal and insecticidal compounds. 4,021,420, Cl. 260-239.00B.
Baker, Don R.: *See—*
Arneklev, Duane R.; and Baker, Don R., 4,021,228.
Arneklev, Duane R.; and Baker, Don R., 4,021,229.
Baker, Donald H.; Bowe, Larry J.; Manning, Kenzel P.; and Post, William C., to Sperry Rand Corporation. Vertical path control for aircraft area navigation system. 4,021,009, Cl. 244-180.000.
Baker, Max Norris, to R. J. Reynolds Tobacco Company. Apparatus for applying uniting bands to co-axial rod-shaped articles. 4,020,852, Cl. 131-94.000.
Bakes, Michel: *See—*
Besson, Paul; Guerin, Jean; Brun, Pierre; and Bakes, Michel, 4,021,531.
Bakken, Kenneth W.; and Larson, David G. Cover assembly. 4,021,131, Cl. 404-25.000.
Balkwill, John T.: *See—*
Asam, Adolf R.; and Balkwill, John T., 4,021,216.
Ball, Kenneth D.: *See—*
Myers, Felix E.; Ball, Kenneth D.; Michetti, Anthony; and Warner, Charles E., 4,021,632.
Ballast-Nedam Group N.V.: *See—*
Wegewijs, Hendrik Franciscus; and Wolters, Tjako Aaldrik, 4,020,573.
Baltrush, John J., to Robertshaw Controls Company. Stepping motor. 4,021,689, Cl. 310-41.000.
Banczak, Daniel Philip; and Tan, William Eric, to American Can Company; and M & T Chemicals Inc., part interest to each. Jet printing ink composition. 4,021,252, Cl. 106-30.000.
Bando Chemical Industries, Ltd.: *See—*
Takeno, Keigo; Matsunaga, Yasuyuki; Nomura, Ryoichi; and Nagata, Akihiro, 4,020,945.
Banker, Harold J., to Pram, Inc. Magnetic and electrostatic transfer of particulate developer. 4,021,587, Cl. 427-18.000.
Barber-Colman Company: *See—*
Townsend, Franklin L.; and Govig, Robert L., 4,020,876.
Barczynski, J. Robert; Deffenbaugh, Milton L.; Hedrick, Melvin R.; and Janssen, Jerry F., to GTE Sylvania Incorporated. Apparatus for fabricating a color cathode ray tube. 4,021,819, Cl. 354-1.000.
Barlai, Jozsef: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Siposs, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.
Barlow, Gordon A.; and Nix, Donald F., to Marvin Glass & Associates. Action accessory for use with travelling toy. 4,020,588, Cl. 46-216.000.
Barlow, Gordon A., to Marvin Glass & Associates. Accumulative comparative timing device. 4,021,046, Cl. 273-148.00R.
Barreau, Michel: *See—*
Cotrel, Claude; Jeanmart, Claude; and Barreau, Michel, 4,021,554.
Barrett, Harold F. Accelerated production of fermented alcoholic beverages. 4,021,579, Cl. 426-11.000.
Barry, Peter S., to Automation Industries, Inc. Sled for ultrasonic NDT system. 4,020,679, Cl. 73-67.80S.
Barsom, Shafik, to Richard Wolf GmbH. Device for catheterizing the bladder. 4,020,840, Cl. 128-276.000.
Bartel, Franz; and Dub, Karl, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Swing drive, in particular a reciprocating drive for moulds in continuous casting plants. 4,020,703, Cl. 74-600.000.
Barthalon, Maurice. Unitary reciprocating motor and compressor with gas cushioning. 4,021,151, Cl. 417-417.000.
BASF Aktiengesellschaft: *See—*
Eisele, Wolfgang; Petersen, Harro; Mayer, Johann; and Wittmann, Otto, 4,021,413.
Fischer, Adolf, 4,021,223.
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,021,222.
Frank, Anton; Karn, Helmut; and Dockner, Toni, 4,021,442.
Hoffmann, Werner; and Baumann, Manfred, 4,021,491.
Horn, Peter; Teege, Gernot; Fliege, Werner; Weiss, Frank; and Meissner, Bernd, 4,021,408.
Kummer, Rudolf; Schwirten, Kurt; Schindler, Hans-Dieter, deceased; Schindler, Maria Elisabeth; Lang, Ute; and Schindler, Rainer, heirs-at-law, 4,021,463.
Preugschas, Helmut; Daubach, Ewald; Fischer, Roman; and Herrmann, Manfred, 4,021,226.
Scholl, Karl Heinz; and Grimm, Gerhard, 4,021,521.
BASF Wyandotte Corporation: *See—*
Austin, Arthur L.; Levis, William W., Jr.; and Patton, John T., Jr., 4,021,385.
Bastian, Erich. Quad antenna support. 4,021,811, Cl. 343-742.000.
Bates, Erwin Frederick; and Whiting, Roy Marvin, to Universal Instruments Corporation. Taped belt electronic component centering device. 4,021,292, Cl. 156-552.000.
Batzer, Hans; and Habermeier, Jurgen, to Ciba-Geigy Corporation. Unsaturated, linear polyester compositions. 4,021,506, Cl. 260-868.000.
Bauer, Betty A.: *See—*
Bauer, Martin G.; and Bauer, Betty A., 4,020,974.
Bauer, Eberhard: *See—*
Schacht, Hans; Bauer, Eberhard; Wurth, Walter; Schleicher, Karl; and Soyer, Wolfgang, 4,021,342.
Bauer, Martin G.; and Bauer, Betty A. BB shot container and dispensing filler. 4,020,974, Cl. 221-307.000.
Bauerkemper, Michael I.: *See—*
McCartney, Ronald L.; Hogan, Vaughn C.; Landgreen, Eleanor A.; and Bauerkemper, Michael I., 4,021,098.
Baum, Peter N.; and Mitchell, Michael J., to Raytheon Company. Distress signal protection system. 4,021,739, Cl. 325-364.000.
Baumann, Manfred: *See—*
Hoffmann, Werner; and Baumann, Manfred, 4,021,491.
Baumbach, Roger J. Hot air heating system. 4,020,823, Cl. 126-121.000.
Bausch & Lomb Incorporated: *See—*
Martens, Alexander E., 4,021,116.
Baverstock, Richard, to Impco Carburetion, Inc. Economizer valve for use with gas-powered internal combustion engines. 4,020,810, Cl. 123-120.000.
Bayer Aktiengesellschaft: *See—*
Beck, Gunther; Doring, Fritz; Heitzer, Helmut; and Holtschmidt, Hans, 4,021,443.
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,021,571.
Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, 4,021,221.
Schmitz, Reinold; and Wittig, Christoph M., 4,021,455.
Bayliss, Ronald W., to NL Industries, Inc. Drier for temperature sensitive materials. 4,020,564, Cl. 34-57.00R.
BBC Brown Boveri & Company Limited: *See—*
Delassus, Jean, 4,021,602.
Beamon, Howard L.: *See—*
King, J. Frank; Lathery, Willie M.; and Beamon, Howard L., 4,020,775.
Bearfield, Clair A.: *See—*
Weber, Albert J.; Erling, Frank H.; and Bearfield, Clair A., 4,021,028.
Beaton, William Ingram, to Standard Oil Company (Indiana). Method for upgrading black oils. 4,021,335, Cl. 208-309.000.
Becht, Reimund: *See—*
Muller, Ewald; and Becht, Reimund, 4,020,749.
Beck, Gunther; Doring, Fritz; Heitzer, Helmut; and Holtschmidt, Hans, to Bayer Aktiengesellschaft. Perchlorodiazafulvene. 4,021,443, Cl. 260-309.000.
Becker, Mitchell, to Halcon International, Inc. Recovery of alkylene glycols by azeotropic distillation with 1,2,3-trimethyl benzene. 4,021,311, Cl. 203-69.000.
Becker, Robert R. Mechanical light switch timer. 4,021,626, Cl. 200-33.00R.
Beckman Instruments, Inc.: *See—*
Polito, Alan J., 4,021,535.
Beckmann, Martin Josef: *See—*
Swann, Ferris George; and Beckmann, Martin Josef, 4,021,189.
Beermann, Paul, to Hagenuk & Co. GmbH. Detonator. 4,020,764, Cl. 102-70.00S.
Beetle, Robert H., to Abex Corporation. Railroad brake shoes with separable insert engageable with flange of a wheel. 4,020,928, Cl. 188-237.000.
Behrend, Hans. Bristle ring for use in dental care. 4,020,522, Cl. 15-180.000.

Beierfuss, Gunter: *See—*
Ahrens, Gunter; Hesse, Hans Hermann; Beierfuss, Gunter; and Wagner, Erich, 4,020,531.

Belanger, Wilfred E., to U.S. Industries, Inc. Inner door pull for automobiles. 4,021,072, Cl. 296-71.000.

Belcher, Richard A.: *See—*
Kozacka, Frederick J.; and Belcher, Richard A., 4,021,765.

Bell & Howell Company: *See—*
Gaynor, Joseph, 4,021,106.

Bell, Malcolm Rice, to Sterling Drug Inc. 2-Substituted-indole-1-lower-alkanecarboxamides. 4,021,448, Cl. 260-326.12R.

Bell, Malcolm Rice, to Sterling Drug Inc. 2,5-Dimethyl-1-pyrrole-lower-alkanecarboxamides. 4,021,566, Cl. 424-274.000.

Bell Telephone Laboratories, Incorporated: *See—*
Alsberg, Dietrich Anselm, 4,021,731.
Bobeck, Andrew Henry; and Fischer, Robert Frederick, 4,021,791.
Bondybey, Vladimir Edmund; Brus, Louis Eugene; Payne, Irene Dion; and Rentzepis, Peter Michael, 4,021,217.
Gitlin, Richard Dennis; and Magee, Francis Robert, Jr., 4,021,738.
Guenther, Robert Patrick, 4,021,265.
Jones, Charles Elmer, Jr.; and MacPherson, William Frederick, 4,021,617.
O'Neill, John Francis; and Popper, Howard Robert, 4,021,622.

Bell, Walter, to Star Expansion Industries Corporation. Tension indicator for fastener means. 4,020,734, Cl. 85-62.000.

Bellew, Wilfred Thomas, to Newage Engineers Limited. Marine propulsion systems with variable-pitch screw propellers. 4,020,781, Cl. 115-34.00A.

Beloglazov, Alexandr Petrovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.

Beloit Corporation: *See—*
Schmaeng, John F., 4,021,295.

Benda Kogyo Co., Ltd.: *See—*
Yashiro, Kazuyoshi, 4,020,878.

Bendix Corporation, The: *See—*
Epstein, Michael, 4,020,702.
Spratt, Brendan J., 4,021,808.
Thuren, John B.; and Tomala, Ambrose, 4,020,803.

Benjamin, Milton Lloyd; and Miles, Wilbur Nelson, to Erickson Tool Company. Floating tool holder. 4,021,132, Cl. 408-127.000.

Benkoe, Erwin: *See—*
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,021,041.

Benner, Dorothy, to Picture Doll Company. Doll with envelope for photo image face, and hair concealing envelope opening. 4,020,586, Cl. 46-164.000.

Benois, Jean-Claude, to Rhone-Poulenc Industries. Fertilizer containing growth activators for plants. 4,021,220, Cl. 71-27.000.

Benschoter, Melvin D. Animal trapping apparatus. 4,020,585, Cl. 43-96.000.

Benzon-Petersen, Boye Ditlef; and Lorant, Istvan Stefan, to AB Akerlund & Rausing. Apparatus for storage and feeding of bags. 4,020,618, Cl. 53-390.000.

Bercher, Francois L., to Elinca S.A. Process and device for the photographic reproduction of diapositives. 4,021,831, Cl. 354-295.000.

Berg, Joseph A. Automatic agitator for film development. 4,021,023, Cl. 259-73.000.

Berger, Frank M. Process for the alleviation of depression by administration of non-addicting meperidine analogues. 4,021,565, Cl. 424-267.000.

Bergeron, Normand, to International Shoe Machine Corporation. Roughing machine having tool position adjusting mechanism. 4,020,660, Cl. 69-6.500.

Bergh, John C., to Wheelabrator-Frye, Inc. Convertible blast cleaning unit. 4,020,596, Cl. 51-9.00M.

Berghahn, Walter G.; and Weinstein, Jack, to Bristol-Myers Company. Ball roll-on dispenser. 4,021,125, Cl. 401-213.000.

Bernard L. Dalsin Co.: *See—*
Dalsin, Bernard L.; Dalsin, George J.; and Schwaab, Lawrence T., 4,020,754.

Bernett, Frank E., to Tile Council of America, Inc. Cementious composition for use in preparing pointing compounds or mortar compounds. 4,021,257, Cl. 106-90.000.

Bernstein, Seymour: *See—*
Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, 4,021,544.
Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, 4,021,545.

Berthiaume, Robert L. Filter for plastic extruding machine. 4,021,346, Cl. 210-179.000.

Besson, Paul; Guerin, Jean; Brun, Pierre; and Bakes, Michel, to Ugine Aciers. Process for the separation of zirconium and hafnium tetrachlorides from mixtures thereof. 4,021,531, Cl. 423-492.000.

Bettes, Ocia L.: *See—*
Chappell, Herman Eli; and Bettes, Ocia L., 4,020,580.

Betts, William L., to NCR Corporation. Interpolating rate multiplier. 4,021,616, Cl. 179-15.0BV.

Beymer, Glen E. Mobile forming machine with embossing rolls. 4,020,666, Cl. 72-177.000.

Bezdek, Miloslav: *See—*
Spisiak, Juraj; Jansa, Milos; Bezdek, Miloslav; and Ferdus, Stanislav, 4,020,877.

Bhavsar, Guy Michel. Tunnel-type commercial-duty washing machine. 4,020,659, Cl. 68-27.000.

Biere, Helmut: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.

Bieser, Herbert J., to UOP Inc. Process for separating ethylbenzene. 4,021,499, Cl. 260-674.0SA.

Billett, Ronald J.; and Harper, Bruce M., to FMC Corporation. Power strapping tool. 4,020,879, Cl. 140-123.600.

Bilow, Henry J.: *See—*
Black, Lawrence M.; Jackson, Egbert H., Jr.; and Bilow, Henry J., 4,021,813.

Binger, Wayne W.; Collins, John W., III; Fahnestock, Melvin R.; and Stuppy, George H., to Aluminum Company of America. Separation of joined plastic and metal components. 4,020,992, Cl. 241-18.000.

Binkley, Howard J. R., to Federal-Mogul Corporation. Aramid fiber reinforced abrasive wheel. 4,021,209, Cl. 51-298.00A.

Bio-Rad Laboratories, Inc.: *See—*
Delony, Timothy Edwin; Gangwer, James R.; and Monthony, James F., 4,021,324.

BioMagnetics International Inc.: *See—*
Davis, Albert Roy, 4,020,590.

Bird, Forrest M. Respirator and method. 4,020,834, Cl. 128-145.600.

Birrenbach, Gerd: *See—*
Speiser, Peter; and Birrenbach, Gerd, 4,021,364.

Bizzarri, Venanzio, to Bulten-Kanthal Aktiebolag. Electrical resistance element. 4,021,770, Cl. 338-332.000.

Bjervig, Leon Hans-Hother. Sealing device. 4,020,607, Cl. 52-173.0DS.

Bjork, Anders Karl Konrad: *See—*
Hernestam, Sven Erik Harry; Bjork, Anders Karl Konrad; Abramo, Aina Lisbeth; and Kjellberg, Bengt Erik Sigvard, 4,021,564.

Blach, Evald, to Aktieselskabet Volund. Sluice for clinker and ashes. 4,020,773, Cl. 110-165.00R.

Black, Lawrence M.; Jackson, Egbert H., Jr.; and Bilow, Henry J., to United States of America, Navy. Geometrically derived beam circular antenna array. 4,021,813, Cl. 343-768.000.

Bland, Charles M.: *See—*
Kruzan, Albert W.; Boppart, Loren P.; and Bland, Charles M., 4,021,064.

Blass, David A.: *See—*
Collins, Johnny; Merrell, Richard G.; and Blass, David A., 4,021,741.

Blatt, Leland F. Power wedge clamp with guided arm. 4,021,027, Cl. 269-32.000.

Bliss, John H. Method and apparatus to overcome aircraft control problems due to wind shear. 4,021,010, Cl. 244-182.000.

Bobeck, Andrew Henry; and Fischer, Robert Frederick, to Bell Telephone Laboratories, Incorporated. Magnetic bubble PROM memory. 4,021,791, Cl. 340-174.0TF.

Bochmann, Carl E.: *See—*
Groth, Hugh F.; Bochmann, Carl E.; and Hunt, Guilbert M., 4,020,871.

Bockelmann, John B.: *See—*
Raymond, Leonard; Bockelmann, John B.; and Tirado, William, Jr., 4,021,580.

Bodo, Gerhard: *See—*
Cullen, Ernest; Meindl, Peter; Tuppy, Hans; and Bodo, Gerhard, 4,021,551.

Bodor, Nicolae S., to Interx Research Corporation. Pro-drug forms of digoxin and method of preparing and using same. 4,021,546, Cl. 424-182.000.

Boehringer Ingelheim GmbH: *See—*
Cullen, Ernest; Meindl, Peter; Tuppy, Hans; and Bodo, Gerhard, 4,021,551.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; Engelhardt, Albrecht; and Taunecker, Werner, 4,021,576.
Kutter, Eberhard; Austel, Volkard; Eberlein, Wolfgang; and Heider, Joachim, 4,021,558.
Losel, Walter; Traunecker, Werner; and Hoefke, Wolfgang, 4,021,547.
Nordstrom, Cai Gustav Rabbe; and Veerhoff, Peter, 4,020,835.
Schmidt, Gunther; Engelhardt, Gunther; and Puschmann, Sigfrid, 4,021,557.
Schromm, Kurt; Mentrup, Anton; Renth, Ernst-Otto; and Traunecker, Werner, 4,021,485.
Seeger, Ernst; Engel, Wolfhard; Nickl, Josef; and Teufel, Helmut, 4,021,479.

Bogner, Richard D. Circularly polarized transmitting antenna employing end-fire elements. 4,021,815, Cl. 343-727.000.

Bohlmark, Sven Arne, to Sunds Aktiebolag. Press binding machine. 4,020,755, Cl. 100-12.000.

Bohnlein, Friedrich; and Geier, Roland, to Idra-Pressen G.m.b.H. Apparatus for controlling the volume and pressure of a pressure medium in a die-casting machine. 4,020,862, Cl. 137-115.000.

Bohusch, Glen O., to General Signal Corporation. Blending valve for electro-pneumatic brakes. 4,021,079, Cl. 303-3.000.

Boiko, Georgy Alexandrovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zame-

shaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.

Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, to Hoffmann-La Roche Inc. Antidandruff compositions containing 9-(4-lower alkoxy-2,3,6-trilower-alkylphenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid lower alkyl amides. 4,021,574, Cl. 424-324.000.

Bolle, Fred; Lee, Chen Yi; and Tardiff, Daniel A., to Bolle, Fred; Lee, Chen Yi; and Tardiff, Daniel A., part interest to each. Method and apparatus for automatic switching. 4,021,679, Cl. 307-117.000.

Bolls, Alfred W.: *See—*
Fowler, Allan R.; and Bolls, Alfred W., 4,021,048.

Bondybey, Vladimir Edmund; Brus, Louis Eugene; Payne, Irene Dion; and Rentzepis, Peter Michael, to Bell Telephone Laboratories, Incorporated. Detecting optical fiber defects. 4,021,217, Cl. 65-13.000.

Boppart, Loren P.: *See—*
Kruzan, Albert W.; Boppart, Loren P.; and Bland, Charles M., 4,021,064.

Borchert, Peter Jochen; and Neff, Jerry Lee, to Miles Laboratories, Inc. Liquid detergent composition. 4,021,377, Cl. 252-546.000.

Borg-Warner Corporation: *See—*
Ellis-Anwyl, David R., 4,021,700.
Norbeck, Dean K., 4,021,704.
Winter, Rudolph Richard, 4,020,937.
Woollard, Gary A., 4,020,711.

Borisevich, Vladimir Karpovich: *See—*
Gubsky, Alexei Alexeevich; Borisevich, Vladimir Karpovich; Volkov, Anatoly Ivanovich; and Moichanjuk, Valery Matveevich, 4,020,663.

Boriss, Robert P., to United States of America, Army. Method and apparatus for guiding aircraft along curved path approach profiles. 4,021,806, Cl. 343-108.00R.

Bossaert, Jean, to Thomson-CSF. Axial transverse tomography system. 4,021,673, Cl. 250-445.00T.

Boswell, Robert F., Jr.: *See—*
Welstead, William J., Jr.; and Boswell, Robert F., Jr., 4,021,552.

Bourgeois, Armand E., to Sanders Associates, Inc. Bottom release mechanism for a sonobuoy. 4,020,514, Cl. 9-8.00R.

Bowe, Larry J.: *See—*
Baker, Donald H.; Bowe, Larry J.; Manning, Kenzel P.; and Post, William C., 4,021,009.

Brader, Walter H., Jr.; Cuscurida, Michael; and Watts, Lewis W., Jr., to Texaco Development Corporation. Infused polymer containing polyols and polyurethane compositions based thereon. 4,021,384, Cl. 260-2.5AP.

Bradley, Daniel Joseph; and Sibbett, Wilson. Electron-optical image tube. 4,021,693, Cl. 313-99.000.

Bradley, Frank R. Instruments and methods for measuring characteristics of only a selected portion of a transmission channel. 4,021,625, Cl. 179-175.30R.

Bradley, John E., to Ford Motor Company. Viscous blower drive. 4,020,634, Cl. 60-517.000.

Braid, Milton, to Mobil Oil Corporation. 2,2,4-Trimethylpentyl-N-naphthyl anthranilate. 4,021,470, Cl. 260-471.00R.

Braig, Siegfried: *See—*
Moller, Hinrich; Osberghaus, Rainer; Gloxhuber, Christian; and Braig, Siegfried, 4,021,539.

Branch, James R.: *See—*
Oakes, Gilbert B., 4,021,056.

Brandriff, Robert C.: *See—*
Poncy, Richard P.; Poncy, Mark P.; Poncy, George W., Sr.; Poncy, George W., Jr.; and Brandriff, Robert C., 4,020,841.

Branz, Francis: *See—*
Chaya, John E.; Bredbenner, Charles; Minnich, Elmer; and Branz, Francis, 4,021,379.

Braun, Franz Josef, to Frankische Isolierrohr-und Metallwarenwerke Gebr. Kirchner. Apparatus for making tubing from thermoplastic synthetic material. 4,021,178, Cl. 425-325.000.

Braunschweig, Ernie D.; and Wilson, Robert E., to United States of America, Air Force. Free expansion nozzle for gas dynamic lasers. 4,021,753, Cl. 331-94.50D.

Bravence, Benjamin M.; and Wilson, Maurice D. Hoop and device for "walking" same. 4,020,589, Cl. 46-220.000.

Bray, Donald T., to Desalination Systems, Inc. Membrane cartridge with improved central collection tube. 4,021,351, Cl. 210-232.000.

Breda Termomeccanica S.p.A.: *See—*
Straffi, Franco, 4,021,204.

Bredbenner, Charles: *See—*
Chaya, John E.; Bredbenner, Charles; Minnich, Elmer; and Branz, Francis, 4,021,379.

Breitzman, James J., to ITP Corporation. Apparatus for forming composition board by extrusion. 4,021,174, Cl. 425-135.000.

Brekke, Carroll E. Gas pressure driven pump. 4,021,147, Cl. 417-138.000.

Brendel, Albert E., to Lebow Associates, Inc. Force measuring apparatus. 4,020,686, Cl. 73-141.00A.

Bridgend Investments Limited: *See—*
Sharp, Herbert J., 4,021,518.

Bridon Engineering Limited: *See—*
Hart, John Charles Humphreys, 4,021,016.

Brill, William F., to Halcon International, Inc. Preparation of epoxides. 4,021,453, Cl. 260-348.50L.

Brinegar, Paul E. Electrical conductor and short circuit locator. 4,021,730, Cl. 324-52.000.

Bristol-Myers Company: *See—*
Berghahn, Walter G.; and Weinstein, Jack, 4,021,125.
Lyon, Robert, 4,021,354.

Britcher, Susan F.: *See—*
Remy, David C.; and Britcher, Susan F., 4,021,561.

British Columbia Research Council: *See—*
Sanders, Raymond J., 4,021,019.

British Petroleum Company Limited, The: *See—*
Webb, Michael Guthrie, 4,021,344.

British Turntable Company, Limited: *See—*
Hardy, David, 4,020,767.

Britz, John A.: *See—*
Nelson, David M.; Stribrsky, William; and Britz, John A., 4,021,036.

Broberg, Frederick N., to Harrigan, Paul D.; Male, George H.; and Broberg, Frederick N. Solar energy collecting system. 4,020,827, Cl. 126-271.000.

Brocchi, Mario, to F. Lli Sandretto S.a.s. Device for adjusting the opening travel of the movable plate of a molding machine for plastic materials. 4,020,709, Cl. 74-89.150.

Brodeur, Lester R., to Sanders Associates, Inc. Print-on-the-fly pager. 4,021,608, Cl. 178-30.000.

Broding, Robert A., to Standard Oil Company (Indiana). Seismic source with no reaction mass. 4,020,919, Cl. 181-119.000.

Brokke, Mervin E.: *See—*
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,021,224.

Brook, Richard Morley; and Elliot, Eric, to AutoSystems Limited. Grading apparatus. 4,021,336, Cl. 209-74.00M.

Brooke, Edric R., to Xerox Corporation. Doctoring means. 4,020,788, Cl. 118-7.000.

Brooks, John Gedny: *See—*
Slatter, John Reginald; Jackson, James Albert; Brooks, John Gedny; Ward, Albert John Clark; and Dewhurst, Alan, 4,020,926.

Brooks, Lawrence L. Hair stylist's accessory. 4,021,197, Cl. 21-84.000.

Brown, Boveri & Cie. A.G.: *See—*
Runtsch, Erhard, 4,021,699.

Brown Boveri Sulzer Turbomachinery, Ltd.: *See—*
Franklin, Clifford John, 4,021,139.

Brown, Kenneth Robson; Holmes, James; and Whyman, Richard David, to Ferranti, Limited. Gyroscopic apparatus. 4,020,701, Cl. 74-5.00R.

Brown, Robert W.; and deBoer, Nico, to J. Ray McDermott & Co., Inc. Vessel and apparatus for at-sea retrieval of buoys and anchors. 4,020,777, Cl. 114-258.000.

Brown, Theodore G. Paint brush dip gauge. 4,020,523, Cl. 15-257.050.

Brown & Williamson Tobacco Corporation: *See—*
Cogbill, Philip Hancock, II, 4,020,850.

Brun, Pierre: *See—*
Besson, Paul; Guerin, Jean; Brun, Pierre; and Bakes, Michel, 4,021,531.

Brunetti, Luciano: *See—*
Gasparro, Luigi; and Brunetti, Luciano, 4,021,127.

Brunswick Corporation: *See—*
Adler, Ralph P. I., 4,020,891.

Brus, Louis Eugene: *See—*
Bondybey, Vladimir Edmund; Brus, Louis Eugene; Payne, Irene Dion; and Rentzepis, Peter Michael, 4,021,217.

Bryer, Jack, to Wood Industries, Inc. Printing ink metering pump. 4,020,760, Cl. 101-366.000.

Bubbers, John J., to Teledyne, Inc. Woofer equalizer. 4,021,614, Cl. 179-1.0VL.

Buchheit, Otto K. Entry conveyor apparatus for cooling beds. 4,020,942, Cl. 198-422.000.

Budapesti Muszaki Egyetem: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Sipos, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.
Petro, Jozsef; Mathe, Tibor; and Tungler, Antal, 4,021,371.

Budrick, Ronald G.; King, Frank T.; Nolen, Robert L., Jr.; and Solomon, David E., to KMS Fusion, Inc. Method for manufacturing glass frit. 4,021,253, Cl. 106-53.000.

Buescher, Francis Joseph: *See—*
Gough, Robert George; and Buescher, Francis Joseph, 4,021,407.

Bulso, Joseph D., Jr.; and Hipple, Robert T., deceased (by Hipple, Glendora, executrix), to Redicon Corporation. Triple action mechanism for producing high reduction cups in a double action press. 4,020,670, Cl. 72-349.000.

Bulten-Kanthal Aktiebolag: *See—*
Bizzarri, Venanzio, 4,021,770.

Bundy, Gordon L., to Upjohn Company, The. 9-Deoxy-9α-hydroxymethyl-PGF_2 analogs. 4,021,467, Cl. 260-468.00D.

Burant, Leonard Joseph, to Globe-Union Inc. Sea water battery with a lead chloride cathode and method of making the same. 4,021,597, Cl. 429-119.000.

Burgudjiev, Eduard Todorov: *See—*
Slavinski, Ivan Assenov; Angelov, Todor Dimitrov; Vukolov, Dmitri Dmitrievich; Burgudjiev, Eduard Todorov; and Komitovski, Mihail Dimitrov, 4,020,545.

Burig, Robert G.: *See—*
Jones, Donald H.; Burig, Robert G.; and McNally, Paul F., 4,021,714.

Burke, George K.: *See—*
Raines, Kenneth; and Burke, George K., 4,021,353.

Burkhardt, Gottfried, to Diehl datensysteme G.m.b.H. Type carrier arrangement for roller printing. 4,020,758, Cl. 101-110.000.

Burron Medical Products, Inc.: *See—*
Raines, Kenneth; and Burke, George K., 4,021,353.

Burroughs Corporation: *See—*
Marr, George, 4,021,788.
Seeley, Dunham Briggs; and Hassel, David Robert, 4,021,060.

Burroughs Wellcome & Co., Inc.: *See—*
Smith, Sidney Edwin; O'Reilly, Kevin Joseph; and Prydie, John, 4,021,302.

Burton, Frank. Wheel borne counter rotating disc alternator. 4,021,690, Cl. 310-67.00R.

Burzlauer, Gert: *See—*
Eichinger, Johann; Strehler, Richard; and Burzlauer, Gert, 4,020,934.

Bus Bodies (S.A.) Limited: *See—*
Johnson, Neville Robert, 4,020,717.

Bush, Paul S. Knock down modular unit and assemblies thereof. 4,021,089, Cl. 312-257.00R.

Bush, Willard Carl. Transmission powered air conditioner compressors. 4,021,214, Cl. 62-244.000.

Butler Automatic, Inc.: *See—*
Meihofer, Edward F., 4,021,002.
Meihofer, Edward F.; and DiGirolamo, Tony P., 4,021,031.

Butuzov, Vladimir Petrovich: *See—*
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.

Byk Gulden Lomberg Chemische Fabrik GmbH: *See—*
Schmidt, Richard; and Klemm, Kurt, 4,021,542.

Byrt, Graham A. B.; and Mockett, John E., to Masson Scott Thrissell Engineering Limited. Machine drive assemblies. 4,020,722, Cl. 83-74.000.

C. P. Clare & Company: *See—*
Deeg, Wyman L., 4,020,996.

Callies, Fritz A., to Rexnord Inc. Telescoping drive line. 4,020,651, Cl. 64-23.000.

Camerik, Eduard, to U.S. Philips Corporation. Optical focussing device for focussing a radiation beam. 4,021,101, Cl. 350-255.000.

Campi, Morris, to United States of America, Army. EMP line filter using MOV devices. 4,021,759, Cl. 333-70.00R.

Campi, Morris, to United States of America, Army. EMP circuit board filter using MOV devices. 4,021,760, Cl. 333-70.00R.

Campioni, Armando, to Indesit Industria Elettrodomestici Italiana S.p.A. Demodulating circuit for color television signals. 4,021,842, Cl. 358-24.000.

Camras, Marvin, to IIT Research Institute. Endless loop cartridge for video. 4,020,999, Cl. 242-55.19A.

Canadian General Electric Company Limited: *See—*
Whiteley, Eric, 4,021,692.

Canadian International Paper Company: *See—*
Major, Frederick William; and Nicolle, Francois Marcel Andre, 4,021,493.

Canadian Lady-Canadelle Inc.: *See—*
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,020,983.

Canadian Patents and Development Limited: *See—*
Kawasaki, Brian S.; and Johnson, Derwyn C., 4,021,099.

Canon Kabushiki Kaisha: *See—*
Iura, Yukio; Yamamichi, Masayoshi; Uchiyama, Takashi; Taguchi, Tetsuya; and Mashimo, Yukio, 4,021,828.
Kawashima, Hirokuni; and Suzuki, Kiyoshi, 4,021,237.
Matkan, Josef, 4,021,586.
Tanaka, Hidetoshi; Sato, Tadashi; and Kasamura, Toshiro, 4,021,109.
Uchiyama, Takashi; Mashimo, Yukio; Nakamura, Zenzo; and Sugiura, Yoji, 4,021,824.

Cantley, George A.; and Litzell, John E., to Incom International Inc. Station control selection system. 4,020,713, Cl. 74-479.000.

Carbonell, Jose; Hasler, Rolf; and Walliser, Roland, to Sandoz Ltd. Method and apparatus for winding bobbins. 4,020,998, Cl. 242-39.000.

Cardic and Company: *See—*
Saunders, Carl A., 4,020,592.

Carl Hurth, Maschinen- und Zahnradfabrik: *See—*
Eichinger, Johann; Strehler, Richard; and Burzlauer, Gert, 4,020,934.

Carl Schenck AG: *See—*
Dodt, Hans-Walter, 4,020,684.

Carlo-Erba S.p.A.: *See—*
Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, 4,021,477.

Carlson, Everett W., to Lincoln Brass Works, Inc. Convertible gas valve structure. 4,020,870, Cl. 137-625.300.

Carlson, Peter J., to Airpax Electronics Incorporated. External condition responsive circuit producing alarm when frequency (engine speed) to amplitude signal (oil pressure) ratio exceeds threshold. 4,021,794, Cl. 340-248.00R.

Carlton, Donald Thomas: *See—*
Nuxhall, Orville Gene; and Carlton, Donald Thomas, 4,020,676.

Carnes, Donald W.: *See—*
Fromknecht, Charles T.; and Carnes, Donald W., 4,020,525.

Carter, Carl W., to Caterpillar Tractor Co. Linkage means for bucket positioner system. 4,020,963, Cl. 214-762.000.

Carter, Cecil O., to Phillips Petroleum Company. Process to separate ethyl fluoride and HF. 4,021,312, Cl. 203-80.000.

Caruso, Lorenzo. Device and method for programmed hair coloring. 4,020,854, Cl. 132-9.000.

Casad, Burton M.: *See—*
Mehdizadeh, Parviz; and Casad, Burton M., 4,020,680.

Cascade Industries, Incorporated: *See—*
West, Robert E., 4,020,509.

Casciotti, Albert; and Hall, Leslie Carl, Jr., to AMP Incorporated. Applicator tool. 4,020,540, Cl. 29-749.000.

Cassinelli, Giuseppe: *See—*
Arcamone, Federico; and Cassinelli, Giuseppe, 4,021,601.

Castonguay, Rene: *See—*
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,020,983.

Castro, Raoul; Kleist, Herbert H.; and Meredith, Louis O., to Diversified Interests Inc. Visual altitude alerting indicator. 4,020,787, Cl. 116-129.00K.

Caterpillar Tractor Co.: *See—*
Carter, Carl W., 4,020,963.
Kern, Richard A.; McClung, Carl L.; and Turner, James R., 4,020,809.
Legler, William F., 4,021,212.
Livesay, Richard E., 4,020,959.
Phelps, Elmer B.; and Friede, Allen J., 4,021,049.
Powers, Harold C., 4,021,050.
Wagner, Ernest W., 4,020,574.
Windish, Willis E., 4,020,932.

Caudel, Edward R.; and Raymond, Joseph H., Jr., to Texas Instruments Incorporated. Data input for electronic calculator or digital processor chip. 4,021,656, Cl. 235-156.000.

Caudel, Edward R., to Texas Instruments Incorporated. Virtual ground read-only-memory for electronic calculator or digital processor. 4,021,781, Cl. 340-172.500.

Cavazza, Claudio, to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A. Derivative of nicotinic acid with amides. 4,021,433, Cl. 260-294.80D.

Cavazza, Claudio, to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A. Derivative of nicotinic acid with amines. 4,021,435, Cl. 260-294.80D.

Cavazza, Claudio. Derivatives of nicotinic acid with amines variously substituted. 4,021,436, Cl. 260-294.80E.

Celamerck GmbH & Co. KG: *See—*
Grabinger, Hans; and Sehring, Richard, 4,021,424.

Centre Electronique Horloger S.A.: *See—*
Vittoz, Eric A., 4,020,628.

Centre Technique Industriel dit: Institut Textile de France: *See—*
Raisin, Jean-Pierre; and Helffer, Bernard, 4,020,655.

Cerquone, Felice Mary; Gabrielsen, Rolf Steven; and Willis, Roland George, to Eastman Kodak Company. Photothermographic and thermographic compositions and uses therefor containing sulfonamidophenol reducing agents and four equivalent color couplers. 4,021,240, Cl. 96-29.00D.

Cerrato, Louis R.: *See—*
Piotrowski, Casimir F.; Scidmore, Wright H.; O'Shaughnessy, Robert P.; Marasco, Nicholas P.; Cerrato, Louis R.; and Haines, Clarence C., Jr., 4,020,739.

Ceskoslovenska akademie ved: *See—*
Stoy, Artur; Stoy, Vladimir; and Stol, Miroslav, 4,021,382.

Ceskoslovenska komise pro atomovou energii Praha: *See—*
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, 4,021,368.

Ceyer, Alfons W., to Evans Products Company. Leverless door mechanism. 4,020,594, Cl. 49-220.000.

Chadwick, Donald H., to Russell, Birdsall & Ward, Inc. Method for heat treating by induced current. 4,021,274, Cl. 148-146.000.

Chang, Mike F.: *See—*
Anthony, Thomas R.; Chang, Mike F.; and Cline, Harvey E., 4,021,269.

Chang, William J. H. Nitrile containing aromatic polyamide polymers. 4,021,415, Cl. 260-78.0TF.

Channell, Ronald E.; and O'Pray, John E., to United States of America, Air Force. Gas generating system for chemical lasers. 4,021,362, Cl. 252-188.000.

Chapelet, Gilbert: *See—*
Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, 4,021,207.

Chappell, Herman Eli; and Bettes, Ocia L. Composite fisherman's lure. 4,020,580, Cl. 43-17.500.

Chase, Thomas Louis; Duranti, Dino; and Sassoli, Renato, to RCA Corporation; and Videocolor S.A., part interest to each. Lighthouse having a main filter and a supplemental filter. 4,021,820, Cl. 354-1.000.

Chateau, Louis, to Ducellier et Co. Electronic ignition device for an internal combustion engine. 4,020,816, Cl. 123-148.00E.

Chaya, John E.; Bredbenner, Charles; Minnich, Elmer; and Branz, Francis, to Tenneco Chemicals, Inc. Polyurethane foam and method for its manufacture. 4,021,379, Cl. 260-2.5AN.

Cheneau, Gilbert: *See—*
Gandon, Louis; and Cheneau, Gilbert, 4,021,532.

Cheney, Richard L.: *See—*
Heller, Martin G.; Cheney, Richard L.; and Kautzmann, Karl H., 4,020,880.

Chernick, Leon, to United States of America, Air Force. Single bit

doppler processor for guidance missile system. 4,021,801, Cl. 343-5.0DP.

Chesley, Ronald F.: *See—*
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,021,041.

Chevron Research Company: *See—*
Pisio, Peter; and Kirkvold, Charles F., 4,020,901.

Chiames, George J., to Newell Companies, Inc. Joint structure for modular shelf assembly. 4,021,128, Cl. 403-217.000.

Chiaramonte, Gasper, Jr. Illuminated footwear. 4,020,572, Cl. 36-137.000.

Chiavola, George: *See—*
Chiavola, Victor; Chiavola, George; and Scott, John, 4,020,968.

Chiavola, Victor; Chiavola, George; and Scott, John. Container rim guard and extension device. 4,020,968, Cl. 220-90.000.

Chiba, Takehisa: *See—*
Fujita, Tadashi; Chiba, Takehisa; and Horiuchi, Masato, 4,021,198.

Chiku, Takewo; Ninomiya, Kiyoshi; Yoshida, Takashi; Kogiso, Takeshi; Hayashi, Hiroaki; and Matsui, Noboru, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Sintered beta-alumina article permeable to sodium and potassium ions and methods for producing same. 4,021,255, Cl. 106-73.400.

Child, Edward T.: *See—*
Robin, Allen M.; and Child, Edward T., 4,021,366.

Chinon Industries Incorporation: *See—*
Ito, Isami, 4,021,104.

Chloride Group Limited: *See—*
Foulkes, Stanley Charles, 4,020,882.

Cho, Kon Ho; and Parry, Peter David, to Western Electric Company, Inc. Method of making rib-structure shadow mask for ion implantation. 4,021,276, Cl. 156-644.000.

Chowdhury, Mofazzal Hossain, to Iowa State University Research Foundation, Inc. Method of measuring mechanical damage to grain. 4,020,682, Cl. 73-104.000.

Christensen, Hans, to H. Nielsen & Son Maskinfabrik A/S. Machine for marking objects. 4,020,757, Cl. 101-18.000.

Christensen, Nils J., to Universal Oil Products Company. Integral-skinned polyurethane foam prepared in the presence of a phosphite or phosphine catalyst. 4,021,381, Cl. 260-2.5AZ.

Chromalloy American Corporation: *See—*
Kruzan, Albert W.; Boppart, Loren P.; and Bland, Charles M., 4,021,064.

Chrysler Corporation: *See—*
Miesterfeld, Frederick Otto Richard, 4,021,681.
Vroman, William R., 4,020,539.

Chuprakov, Jury Ivanovich: *See—*
Gorchakov, Mikhail Fedorovich; Kabakov, Mikhail Grigorievich; Kashtanov, Leonid Nikolaevich; Morozov, Viktor Prokofievich; Chuprakov, Jury Ivanovich; and Scherbakov, Vitaly Fedorovich, 4,021,154.

Church, Edgar H., Jr. Ball valve. 4,020,864, Cl. 137-242.000.

Ciba-Geigy AG: *See—*
Seha, Zdenek, 4,021,456.

Ciba-Geigy Corporation: *See—*
Batzer, Hans; and Habermeier, Jurgen, 4,021,506.
Holt, Brian; and Randell, Donald Richard, 4,021,432.
Lind, Hanns, 4,021,468.
Schempp, Heinrich, 4,021,482.
Skelly, James Kenneth; and Farrington, Michael, 4,021,059.

Cincinnati Milacron, Inc.: *See—*
Gough, Robert George; and Buescher, Francis Joseph, 4,021,407.
Losey, Jerry Earl; Witzel, John Richard; and Kauffman, Harry Dean, 4,021,635.

Ciric, Julius, to Mobil Oil Corporation. Organic compound conversion by zeolite ZSM-20 catalysts. 4,021,331, Cl. 208-111.000.

Citizen Watch Co., Ltd.: *See—*
Yoshida, Masateru; Iinuma, Yoshio; Yasuda, Tetuya; and Kimura, Satoshi, 4,020,627.

Citta, Richard W.: *See—*
Podowski, Robert R.; and Citta, Richard W., 4,021,756.

Clairol Incorporated: *See—*
Halasz, Alexander; and Cohen, David, 4,021,486.

Clark, William T., III. Rotating cutter catheter. 4,020,847, Cl. 128-305.000.

Clarke, John E.: *See—*
Andrews, Austin M., II; Clarke, John E.; Gertner, Edward R.; Longo, Joseph T.; and Eden, Richard C., 4,021,836.

Clausen, Kermit D.; and Rhodes, John R., to Columbia Scientific Industries Corporation. High speed pulse processing. 4,021,667, Cl. 250-273.000.

Claxton, Dale H., to TRW Inc. Phase logic demodulator. 4,021,743, Cl. 329-103.000.

Clem, Arthur G., to American Colloid Company. Method and composition for preventing water contaminated with industrial waste seeping through soil containing said water. 4,021,402, Cl. 260-42.120.

Climo, Benjamin G., to Exxon Research and Engineering Company. Perforating apparatus. 4,020,725, Cl. 83-349.000.

Cline, Harvey E.: *See—*
Anthony, Thomas R.; Chang, Mike F.; and Cline, Harvey E., 4,021,269.

Cloup, Jean. Liquid metering pumps. 4,021,153, Cl. 417-443.000.

Coaltek Associates: *See—*
Hutar, William F.; and Marting, Donald G., 4,021,078.

Coats, John N., to Industrial Research & Engineering, Inc. Sheet roll splitter having horizontal cutter. 4,020,726, Cl. 83-397.000.

Coffinberry, George A.; and Kast, Howard B., to United States of America, General Counsel-Code GP. Oil cooling system for a gas turbine engine. 4,020,632, Cl. 60-39.030.

Cogbill, Philip Hancock, II, to Brown & Williamson Tobacco Corporation. Thermoplastic cigarette wrapper. 4,020,850, Cl. 131-15.00R.

Cognitronics Corporation: *See—*
Shepard, David H., 4,021,777.

Cohen, David: *See—*
Halasz, Alexander; and Cohen, David, 4,021,486.

Colao, Angelo A., to Sanders Associates, Inc. Variable curvature optics for lasers. 4,021,754, Cl. 331-94.50C.

Cold Spring Granite Company: *See—*
Alexander, Thomas E., 4,020,610.

Colin, Marcel, to Societe d'Equipements, Manutentions et Transports (S.E.M.A.T.). Ejection bottom control device for refuse collection body. 4,020,962, Cl. 214-518.000.

Collagen Products Pty. Limited: *See—*
Daniel, Leonard, 4,021,522.

Collins, H. Dale; Sheen, Edwin M.; and Gribble, R. Parks, to Holosonics, Inc. Scan acoustical holographic imaging apparatus. 4,021,771, Cl. 340-5.00H.

Collins, John W., III: *See—*
Binger, Wayne W.; Collins, John W., III; Fahnestock, Melvin R.; and Stuppy, George H., 4,020,992.

Collins, Johnny; Merrell, Richard G.; and Blass, David A., to Zenith Radio Corporation. Remote control with reduced responsiveness to interrupted actuating signals. 4,021,741, Cl. 328-69.000.

Collins, Terence J., to Qonaar Corporation. Brake mechanism for turnstiles and the like. 4,020,927, Cl. 188-184.000.

Coloroll Limited: *See—*
Griffin, Gerald Joseph Louis, 4,021,388.

Columbia Gas System Service Corporation: *See—*
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., 4,020,821.

Columbia Scientific Industries Corporation: *See—*
Clausen, Kermit D.; and Rhodes, John R., 4,021,667.

Combustion Equipment Associates, Inc.: *See—*
Field, Edwin L.; Lamantia, Charles R.; Lunt, Richard R.; Oberholtzer, James E.; and Valentine, James R., 4,021,202.

Comfort Products, Inc.: *See—*
Gross, Alexander Louis; and Giese, Erik O., 4,021,640.

Commonwealth Scientific and Industrial Research Organization: *See—*
Waters, Percy Lloyd, 4,021,193.

Communications Satellite Corporation (Comsat): *See—*
Horna, Otakar Anthony, 4,021,740.
Standing, Arthur Frederick, 4,021,758.
Suyderhoud, Henri G.; Onufry, Michael, Jr.; and Kauffman, Eric R., 4,021,623.

Compagnon, Michel, to Maillefer S.A. Cooling installation for use in producing insulated metal wire. 4,020,524, Cl. 15-302.000.

Computer Terminal Systems, Inc.: *See—*
Gross, Joseph; and Stankowski, Stanley, 4,021,032.

Conrad, Daniel T.; Mast, William C.; and Wathen, Tom M., to Goodyear Tire & Rubber Company, The. Thermosetting coating composition of acrylic interpolymers. 4,021,504, Cl. 260-836.000.

Conrotto, Paul A.; and Jones, Henry W., to Spectra-Physics, Inc. Window structure for optical code reading scanners. 4,020,924, Cl. 186-1.00A.

Consolidated-Bathurst Limited: *See—*
Martin, Wilhelm N., 4,021,287.

Consolidated Foods Corporation: *See—*
Arden, Sidney, 4,021,583.

Consolidation Coal Company: *See—*
Hawthorne, Arthur L.; and Hazen, David R., 4,021,076.
May, Francis A., 4,020,546.

Container Corporation of America: *See—*
Kipp, Michael A., 4,020,988.

Continental Oil Company: *See—*
Mehdizadeh, Parviz; and Casad, Burton M., 4,020,680.
Satchell, Donald P., Jr., 4,021,330.

Contraves-Goerz Corporation: *See—*
Jones, Donald H.; Burig, Robert G.; and McNally, Paul F., 4,021,714.

Controlled Power Products Company: *See—*
Lesnick, George; and Marshall, John M., 4,020,818.

Cook, Thomas W.; and Quaglino, Carl A., to Mobil Oil Corporation. System for recording seismic reflection signals in true amplitude. 4,021,772, Cl. 340-15.5DP.

Cooke, Anson Richard; Long, John Whitney; and Wiedman, Steven John, to Amchem Products, Inc. Method for protecting plant life from injury due to frost or sub-freezing temepratures. 4,021,230, Cl. 71-111.000.

Cooper, John Leslie: *See—*
Stockdale, George Fairbank; and Cooper, John Leslie, 4,021,219.

Copley, John R., to Emerson & Cuming, Inc. Buoyancy materials. 4,021,589, Cl. 428-68.000.

Cord, Carl E.: *See—*
Krehbiel, Vivian D.; and Cord, Carl E., 4,021,832.

Corning Glass Works: *See—*
Zine, Anthony R., Jr., 4,021,340.

Corsmeier, Robert J.: *See—*
Dennis, Ronald E.; Treece, William D.; and Corsmeier, Robert J., 4,020,538.

Cosentino, Louis C.; and Springrose, B. Steven. Hermodialysis ultrafiltration system. 4,021,341, Cl. 210-87.000.

Costa, Mario: *See—*
Del Zotto, Giorgio; and Costa, Mario, 4,020,807.

Cotrel, Claude; Jeanmart, Claude; and Barreau, Michel, to Rhone-Poulenc Industries. 1,4-Oxathiino[2,3-c]pyrrole derivatives. 4,021,554, Cl. 424-250.000.

Cournut, Rene; and Gaussens, Gilbert, to Societe Sodermec. Buccal implant for administering solubilizable products. 4,020,558, Cl. 32-40.00R.

Covington, Robert Allen, Jr.: *See*—
Anolick, Colin; and Covington, Robert Allen, Jr., 4,021,600.

Cox, William L., to Goodyear Tire & Rubber Company, The. Anti-hardeners for polymers. 4,021,404, Cl. 260-42.320.

Coxe, Frank S., to Northrop Corporation. Pitch-yaw stabilization system. 4,021,007, Cl. 244-3.130.

Craig, William A. Form for concrete walls. 4,021,014, Cl. 249-45.000.

Crane Co.: *See*—
Groth, Hugh F.; Bochmann, Carl E.; and Hunt, Guilbert M., 4,020,871.

Crill, Marla S., to Nalco Chemical Company. Starch viscosity control agent using an ethoxylated fatty alcohol. 4,021,260, Cl. 106-213.000.

Crook, Edward J., Jr., to American Hoist & Derrick Company. Chain to wire rope connector. 4,021,130, Cl. 403-275.000.

Cross, Barrington; Grasso, Charles Paul; and Walworth, Bryant Leonidas, to American Cyanamid Company. Method for controlling undesirable plant species. 4,021,227, Cl. 71-92.000.

Crowle, Brian, to RCA Corporation. Temperature-sensitive current divider. 4,021,722, Cl. 323-4.000.

Csuros, Zoltan: *See*—
Petro, Jozsef; Mathe, Tibor; Tungler, Antal; and Csuros, Zoltan, 4,021,374.

Csutor, Frank. Accessories and aids for use by ice skaters. 4,021,054, Cl. 280-11.37R.

CTS Corporation: *See*—
Stuckey, Ronald L., 4,021,768.

Cuhel, Gerald A., to Tonka Corporation. Toy vehicle plow mounting. 4,020,587, Cl. 46-202.000.

Cullen, Ernest; Meindl, Peter; Tuppy, Hans; and Bodo, Gerhard, to Boehringer Ingelheim GmbH. 3,6-Bis-(heterocyclic aminoacylamino)-acridines and salts thereof. 4,021,551, Cl. 424-246.000.

Culpepper, Jerry W.; Currie, Harry A.; and Heathcock, William F., to Texas Instruments Incorporated. Beacon tracking system. 4,021,807, Cl. 343-112.00R.

Cumpston, Edward H. Method of correlating the rotor and stator in a mixer-refiner-reactor. 4,020,994, Cl. 241-30.000.

Cuneo, Edward A.; Kato, Makoto; and Wilson, Michael S., to Metropolitan Circuits, Inc. Method of making an electro-discharge electrode. 4,020,535, Cl. 29-25.180.

Cuniberti, Mario, to Owens-Illinois, Inc. Motion translating apparatus and controls therefor. 4,020,707, Cl. 74-37.000.

Cunningham, James Robert. Apparatus for medical injections. 4,020,836, Cl. 128-216.000.

Curley, James Harvey: *See*—
Anhalt, John William; and Curley, James Harvey, 4,021,091.

Currie, Harry A.: *See*—
Culpepper, Jerry W.; Currie, Harry A.; and Heathcock, William F., 4,021,807.

Cuscurida, Michael; Meyer, Lee G.; and Watts, Lewis W., Jr., to Texaco Development Corporation. Infused polymer containing monohydric compounds and polyurethane compositions based thereon. 4,021,383, Cl. 260-2.5AM.

Cuscurida, Michael: *See*—
Brader, Walter H., Jr.; Cuscurida, Michael; and Watts, Lewis W., Jr., 4,021,384.

Cuttill, William E.; and Wagner, Vilma M. Method of constructing credit cards for automatic vending equipment and credit purchase systems. 4,020,536, Cl. 29-25.420.

Czonka, Viktor; and Patlik, Alois, to U.S. Philips Corporation. Cassette detection device for recording and/or playback apparatus. 4,021,855, Cl. 360-69.000.

Dafter, Robert Vincent, Jr., to Western Electric Company, Inc. Method of depositing a metal on a surface. 4,021,314, Cl. 204-30.000.

Dai-Nippon Sugar Manufacturing Co., Ltd.: *See*—
Nakabayashi, Yutaka, 4,021,303.

Daicel, Ltd.: *See*—
Kishi, Kazuo; and Naganuma, Kazuo, 4,021,275.

Dailey, Charles R., to General Tire & Rubber Company, The. Tire mold having washered nails inserted in the vents. 4,021,168, Cl. 425-28.00R.

Dainippon Ink and Chemicals, Incorporated: *See*—
Shimamatsu, Hidenori; Yamada, Masaharu; Tanaka, Toshio; and Suzuki, Yahiko, 4,021,304.

Dainippon Sugar Manufacturing Co., Ltd.: *See*—
Shimamatsu, Hidenori; Yamada, Masaharu; Tanaka, Toshio; and Suzuki, Yahiko, 4,021,304.

Daley, Howard L.; Davidson, Gerald S.; and Mitrovich, Svetislav, to Xerox Corporation. Resilient coupling means for ribbon cartridge mounting plate. 4,020,940, Cl. 197-151.000.

Dalsin, Bernard L.; Dalsin, George J.; and Schwaab, Lawrence T., to Bernard L. Dalsin Co. Cap-type flue damper. 4,020,754, Cl. 98-59.000.

Dalsin, George J.: *See*—
Dalsin, Bernard L.; Dalsin, George J.; and Schwaab, Lawrence T., 4,020,754.

Daniel, Gordon, to Norsk Kjettingindustri A-S Alf Nosted. Tire chain for tractors and the like. 4,020,886, Cl. 152-243.000.

Daniel, Leonard, to Collagen Products Pty. Limited. Method of forming collagen dispersions. 4,021,522, Cl. 264-138.000.

Daniels, Phillip D., to Novi Plastics Company. Stall shower panel kit. 4,020,602, Cl. 52-35.000.

Daniels, Phillip D., to Novi Plastics Company. Shutter construction. 4,020,609, Cl. 52-473.000.

Dante, James G.: *See*—
Glass, Coy M., deceased; and Dante, James G., 4,020,765.

Darling, Myron E. Clamp. 4,020,533, Cl. 24-276.000.

Darling, Myron E. Method of securing hair to a musical instrument bow. 4,020,731, Cl. 84-282.000.

Darnell, William E.; and Malecha, Richard J., to Towmotor Corporation. Exhaust system for lift trucks. 4,020,915, Cl. 180-64.00A.

Dasan, Velu K. K., to Shetty, Ashok Kumar, a part interest. Jacking device. 4,021,018, Cl. 254-93.00H.

Daubach, Ewald: *See*—
Preugschas, Helmut; Daubach, Ewald; Fischer, Roman; and Herrmann, Manfred, 4,021,226.

Daume, Eduard, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Method for the production of an inhibitor coating for a solid rocket propellent charge. 4,021,514, Cl. 264-3.00E.

Davidson, Gerald S.: *See*—
Daley, Howard L.; Davidson, Gerald S.; and Mitrovich, Svetislav, 4,020,940.

Davies, Robert Bruce, to Motorola, Inc. Transistor protection circuit. 4,021,701, Cl. 361-18.000.

Davis, Albert Roy, to BioMagnetics International Inc. Apparatus and method for exposing seeds to a magnetic field. 4,020,590, Cl. 47-1.300.

Davis, Donald H.; and Mossey, John G., to General Electric Company. Combined stop and intercept valve for steam turbines. 4,020,869, Cl. 137-613.000.

Davis, Royston H.; and Searle, Robert J. G., to Shell Oil Company. Cyclopropane carboxylates. 4,021,466, Cl. 260-468.00G.

Davy Powergas Limited: *See*—
Harris, Norman; Shevels, Thomas Frederick; and Dennis, Alan James, 4,021,370.

Dawans, Francois: *See*—
Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, 4,021,207.

Day, Lawrence, to Spitfire Tool & Machine Co., Inc. Polishing fixture. 4,020,600, Cl. 51-237.00R.

Day, Robert L.: *See*—
Smith, Edward A.; and Day, Robert L., 4,020,544.

Dazey Products Company: *See*—
Smith, Kevin R., 4,021,290.

deBoer, Nico: *See*—
Brown, Robert W.; and deBoer, Nico, 4,020,777.

Debourge, Jean-Claude: *See*—
Lacroix, Guy; and Debourge, Jean-Claude, 4,021,549.

DeBruine, Carl: *See*—
Houskamp, Robert W.; and DeBruine, Carl, 4,020,918.

Decker, Floyd V. Road barricade and method of making same. 4,021,020, Cl. 256-1.000.

Deeg, Wyman L., to C. P. Clare & Company. Method and apparatus for winding elongated coils. 4,020,996, Cl. 242-7.030.

Deeter, Ronald C.; Lora, Thad A.; and Pozniko, John M., to Salem Tool Company, The. Latch mechanism for auger string couplings. 4,021,126, Cl. 403-9.000.

Deffenbaugh, Milton L.: *See*—
Barczynski, J. Robert; Deffenbaugh, Milton L.; Hedrick, Melvin R.; and Janssen, Jerry F., 4,021,819.

Deflandre, Rene. Head-stock for a milling and boring machine. 4,020,537, Cl. 29-26.00A.

DeHaeck, Robert J., to La Soudure Electrique Autogene, Procedes Arcos. Flux-cored wires for electrogas welding. 4,021,637, Cl. 219-146.000.

De Jong, Gerrit: *See*—
Radstake, Herman; De Jong, Gerrit; and van der Velden, Josephus Hendrikus Maria, 4,021,309.

Delassus, Jean, to BBC Brown Boveri & Company Limited. Channel furnace for melting metals and alloys with a single inductor coil assuring the heating and forced circulation of the molten metal. 4,021,602, Cl. 13-29.000.

Dellas, Nick. Handle for paint brushes and the like. 4,020,520, Cl. 15-176.000.

Delle-Alsthom: *See*—
Fournier, Jacques; and Thuries, Edmond, 4,020,860.

Delony, Timothy Edwin; Gangwer, James R.; and Monthony, James F., to Bio-Rad Laboratories, Inc. Method for electrophoretic destaining. 4,021,324, Cl. 204-180.00G.

Del Zotto, Giorgio; and Costa, Mario, to SGS-ATES Componenti Elettronici S.p.A. Ignition-control system for internal-combustion engine. 4,020,807, Cl. 123-117.00R.

Demaeyer, Joseph Henri: *See*—
Taxil, Andre Marc Victorin; Divoux, Jacques Clement; and Demaeyer, Joseph Henri, 4,021,696.

DeMauro, Armand A., to Universal Manufacturing Corporation. Automatic capacitor winding machine. 4,021,000, Cl. 242-56.100.

Demerson, Christopher A.: *See*—
Dobson, Thomas A.; Humber, Leslie G.; Demerson, Christopher A.; and Jirkovsky, Ivo L., 4,021,451.

Demey, Charles F., II: *See*—
Atwood, John G.; and Demey, Charles F., II, 4,021,123.

Demny, Werner; and Moeltner, Hermann, to Friedrich Kocks, Firma. Tube rolling. 4,020,667, Cl. 72-205.000.

Den Besten, Alfred: *See—*
Wildman, Claude L.; and Hellmer, George A., 4,020,631.
Denlinger, Edgar Jacob, to RCA Corporation. Diode package. 4,021,839, Cl. 357-74.000.
Dennis, Alan James: *See—*
Harris, Norman; Shevels, Thomas Frederick; and Dennis, Alan James, 4,021,370.
Dennis, Ronald D.: *See—*
Lawson, John E.; and Dennis, Ronald D., 4,021,562.
Dennis, Ronald E.; Treece, William D.; and Corsmeier, Robert J., to General Electric Company. Turbomachinery blade tip cap configuration. 4,020,538, Cl. 29-156.80H.
DePalma, Joseph S. Dispersion nozzle with removable dispersion element. 4,020,904, Cl. 169-74.000.
De Rooij, Abraham H.; and Elmendorp, Jan, to Stamicarbon B.V. Process for the recovery of ε-caprolactam from reaction mixture of ε-caprolactam and sulphuric acid. 4,021,422, Cl. 260-239.30A.
Desalination Systems, Inc.: *See—*
Bray, Donald T., 4,021,351.
DeShetler, Louis K., to Whitehead & Kales Company. Chain adjustment link. 4,020,630, Cl. 59-86.000.
DeSoto, Inc.: *See—*
McLaughlin, Robert L.; and Wood, Donald C., 4,021,360.
Detect-All Security Systems, Inc.: *See—*
Fawcett, James M., Jr.; and Stillman, Ronald G., 4,021,796.
Detinko, Felix Moiseevich: *See—*
Dukshtau, Alexandr Antonovich; Prutkovsky, Samuil Alexandrovich; Detinko, Felix Moiseevich; Golubentsev, Jury Sergeevich; and Lurie, Alexandr Nesanelevich, 4,021,691.
Dettling, Joseph C.: *See—*
Hindin, Saul G.; and Dettling, Joseph C., 4,021,185.
Dettling, Joseph R., to United Technologies Corporation. High efficiency converter of solar energy to electricity. 4,021,267, Cl. 136-89.0PC.
Dettmer, Edward V.; and Heckeroth, Earl T., to Dow Chemical Company, The. Cutting apparatus. 4,021,176, Cl. 425-313.000.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Knorre, Helmut; and Fischer, Joachim, 4,021,264.
Deveraux, Harry R.: *See—*
Welty, Richard K.; Robinson, Dan L.; and Deveraux, Harry R., 4,020,673.
DeVries, Roy F.; and Snyder, William H., II, to DeVries, Roy F. Sublimation transfer and method. 4,021,591, Cl. 428-200.000.
Dewhurst, Alan: *See—*
Slatter, John Reginald; Jackson, James Albert; Brooks, John Gedny; Ward, Albert John Clark; and Dewhurst, Alan, 4,020,926.
Dewhurst & Partner Limited: *See—*
Slatter, John Reginald; Jackson, James Albert; Brooks, John Gedny; Ward, Albert John Clark; and Dewhurst, Alan, 4,020,926.
Diamond Shamrock Corporation: *See—*
Sinka, Joseph V.; and Lichtman, Irwin A., 4,021,365.
DiCicco, Tripoli Joseph. Ear lobe piercing apparatus. 4,020,848, Cl. 128-330.000.
Dickey, Herbert C., to Ealing Corporation, The. Carrier for the presentation of pages of conventional reading material. 4,020,576, Cl. 40-86.00R.
Dickson, Fred D., to Rockwell International Corporation. Burner block valve assembly. 4,021,190, Cl. 431-280.000.
Diehl datensysteme G.m.b.H: *See—*
Burkhardt, Gottfried, 4,020,758.
Diehl, Robert Eugene: *See—*
Lutz, Albert William; and Diehl, Robert Eugene, 4,021,483.
DiGirolamo, Tony P.: *See—*
Meihofer, Edward F.; and DiGirolamo, Tony P., 4,021,031.
Dischert, Robert Adams: *See—*
Hurst, Robert Norman; and Dischert, Robert Adams, 4,021,852.
Distler, Edward C.: *See—*
Kirkpatrick, Harold B.; Distler, Edward C.; and Menzin, Marvin, 4,020,832.
Diversified Interests Inc.: *See—*
Castro, Raoul; Kleist, Herbert H.; and Meredith, Louis O., 4,020,787.
Divoux, Jacques Clement: *See—*
Taxil, Andre Marc Victorin; Divoux, Jacques Clement; and Demaeyer, Joseph Henri, 4,021,696.
Doane, Patrick King: *See—*
Robinson, John William; and Doane, Patrick King, 4,020,728.
Dobson, Thomas A.; Humber, Leslie G.; Demerson, Christopher A.; and Jirkovsky, Ivo L., to American Home Products Corporation. Process for preparing polycyclic heterocyles having a pyran ring. 4,021,451, Cl. 260-332.20A.
Dockner, Toni: *See—*
Frank, Anton; Karn, Helmut; and Dockner, Toni, 4,021,442.
Dr. Ing. Hans Mueller: *See—*
Muller, Hans; and Stumpp, Werner, 4,021,120.
Doddington, Harold W.; and Sheppard, Donald M., to United States of America, Navy. Apparatus for determining salinity of fluids. 4,020,677, Cl. 73-61.00R.
Dodson, Stanton A., to Raymond Lee Organization, Inc., The, a part interest. Portable fireplace grate heater. 4,020,824, Cl. 126-164.000.
Dodt, Hans-Walter, to Carl Schenck AG. Control valve especially for hydraulic absorption dynamometers. 4,020,684, Cl. 73-134.000.
Doehler, Oskar; Dohler, Gunter; and Friz, Walter, to Warnecke Electron Tubes, Inc. Crossed-field amplifier. 4,021,697, Cl. 315-39.300.
Dohler, Gunter: *See—*
Doehler, Oskar; Dohler, Gunter; and Friz, Walter, 4,021,697.
Doktor, Elek: *See—*
Pungor, Erno; Doktor, Elek; Patko, Marton; Havas, Jeno; and Kecskes, Lajos, 4,021,325.
Dola, Frank Peter; and Rossler, Frederick William, Jr., to AMP Incorporated. Flexible conduit connector. 4,021,604, Cl. 174-51.000.
Dolan, Michael J., to Monsanto Company. Electrolytic preparation of phosphorus acid from elemental phosphorus. 4,021,322, Cl. 204-103.000.
Dolhyj, Serge R.; and Milberger, Ernest C., to Standard Oil Company (Ohio), The. Oxidation of 1,3-butadiene to maleic anhydride using a catalyst containing Mo, Sb, V and either one or both of Li and Ce. 4,021,427, Cl. 260-346.80A.
Donaldson Company, Inc.: *See—*
Anderson, Erland D.; Paulson, David S.; and Sullivan, Bruce M., 4,020,783.
Dorazio, Alton: *See—*
Kelly, Patrick M.; and Dorazio, Alton, 4,021,624.
Doria, Gianfederico: *See—*
Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, 4,021,477.
Doring, Fritz: *See—*
Beck, Gunther; Doring, Fritz; Heitzer, Helmut; and Holtschmidt, Hans, 4,021,443.
Dornier System GmbH: *See—*
Huf, Franz, 4,021,159.
Dorr-Oliver Incorporated: *See—*
Priestley, Robert Joseph, 4,021,184.
Doryokuro Kakunenryo Kaihatsu Jigyodan: *See—*
Nei, Hiromichi; and Hashiguchi, Koh, 4,021,234.
Doudet, Michel, to Secim. Draw press. 4,020,668, Cl. 72-285.000.
Dounce, Eric Alexander; and Westbrook, Gregory Lee, to Motorola, Inc. Synchronized, coherent timing system for coherent-on-receive radar system. 4,021,804, Cl. 343-17.10R.
Dow Chemical Company, The: *See—*
Dettmer, Edward V.; and Heckeroth, Earl T., 4,021,176.
Layne, Gilbert S.; and Huml, James O., 4,021,530.
Strycker, Stanley J., 4,021,575.
Doyle, William C., Jr.: *See—*
Hedrich, Loren W.; and Doyle, William C., Jr., 4,021,225.
Dragt, Jan Cornelis Willem, to U.S. Philips Corporation. Electrodynamically controllable pivoting mirror device. 4,021,096, Cl. 350-6.000.
Dreiding, Andre. Molecular models. 4,020,566, Cl. 35-18.00A.
Dreslinski, Daniel M., to Automatic Parking Devices, Inc. Circuit for monitoring the sequence of events at a cashier checkout center. 4,021,644, Cl. 235-92.0TC.
Dreyer, Heinz, to Amazonen-Werke H. Dreyer. Machine for the pneumatic spreading of granular material. 4,020,991, Cl. 239-655.000.
Drummond, Warren W., to PPG Industries, Inc. Novel textile process. 4,020,623, Cl. 57-157.00F.
DSO "ZMM": *See—*
Slavinski, Ivan Assenov; Angelov, Todor Dimitrov; Vukolov, Dmitri Dmitrievich; Burgudjiev, Eduard Todorov; and Komitovski, Mihail Dimitrov, 4,020,545.
Dub, Karl: *See—*
Bartel, Franz; and Dub, Karl, 4,020,703.
Dubinsky, Rudolf Solomonovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.
Du Bois, Edward F., to Singer Company, The. Polarizing key insertion tool. 4,020,547, Cl. 29-629.000.
Dubrov, Nikolai Fedorovich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Savcliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.
Ducellier et Co.: *See—*
Chateau, Louis, 4,020,816.
Dufek, Edward J., to United States of America, Agriculture. Isolation of carboxy-substituted aliphatic hydrocarbons. 4,021,462, Cl. 260-419.000.
Duffy, James B., to United States of America, Energy Research and Development Administration. Waste canister for storage of nuclear wastes. 4,021,676, Cl. 250-506.000.
Duffy, Joseph James. Bolt handle adaptor for a bolt action rifle. 4,020,577, Cl. 42-16.000.
Duggan, George L., to GTE Sylvania Incorporated. Gettered incandescent lamp and method of making same. 4,021,694, Cl. 313-181.000.
Dukshtau, Alexandr Antonovich; Prutkovsky, Samuil Alexandrovich; Detinko, Felix Moiseevich; Golubentsev, Jury Sergeevich; and Lurie, Alexandr Nesanelevich. Electrical machine stator. 4,021,691, Cl. 310-217.000.
Duncan, James E., to Raymond Lee Organization, Inc., The, a part interest. Door of adjustable height. 4,020,595, Cl. 49-306.000.

Dunwell, David William: *See—*
Evans, Delme; Dunwell, David William; and Hicks, Terence Alan, 4,021,440.

Duovel Company: *See—*
Fowler, Allan R.; and Bolls, Alfred W., 4,021,048.

Du Pont de Nemours, E. I., and Company: *See—*
Anolick, Colin; and Covington, Robert Allen, Jr., 4,021,600.
Gajjar, Bharat Jaybhadra, 4,020,654.
Gajjar, Bharat Jaybhadra, 4,020,656.
Grot, Walther Gustav, 4,021,327.
Krespan, Carl George; and Smart, Bruce Edmund, 4,021,489.
McKenna, James Michael, 4,021,400.
Schrock, Richard Royce, 4,021,429.
Vary, Eva M., 4,021,395.
Wu, Souheng, 4,021,396.

Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Pertolieres Elf. Liquid hydrocarbon compositions of improved behavior in the cold and containing diene polymers. 4,021,207, Cl. 44-62.000.

Duranti, Dino: *See—*
Chase, Thomas Louis; Duranti, Dino; and Sassoli, Renato, 4,021,820.

Dyer, Peter; and Waterman, David Charles Alexander, to Imperial Chemical Industries Limited. Production of hydrocarbons. 4,021,501, Cl. 260-683.00R.

Dyhringer, Waldemar S.: *See—*
Goerke, Paul; and Dyhringer, Waldemar S., 4,020,515.

E. S. Ritchie & Sons, Inc.: *See—*
Sherman, Allen Butman, 4,020,559.

E-Systems, Inc.: *See—*
Peck, Wayne P., 4,021,816.

Eakins, Russell W.; and Hagan, Robert August, to International Telephone and Telegraph Corporation. Apparatus and method for cutting continuous stock. 4,020,721, Cl. 83-37.000.

Ealing Corporation, The: *See—*
Dickey, Herbert C., 4,020,576.

Easom Engineering & Manufacturing Corporation: *See—*
Obra, Bart R., 4,020,708.

Eastman Kodak Company: *See—*
Cerquone, Felice Mary; Gabrielsen, Rolf Steven; and Willis, Roland George, 4,021,240.
Wadsworth, Donald Harold; and Vinal, Richard Sturtevant, 4,021,475.
Wright, Roger L., 4,021,496.

Eaton Corporation: *See—*
McDermott, Hugh L., 4,021,161.

Eberlein, Wolfgang: *See—*
Kutter, Eberhard; Austel, Volkard; Eberlein, Wolfgang; and Heider, Joachim, 4,021,558.

Ebert, Gary R., to Ex-Cell-O Corporation. Tap driver apparatus. 4,021,133, Cl. 408-141.000.

Eckstein, Marian; May, Jerzy; Herdegen, Eleonora; and Kulig, Daniel, to Krakowskie Zaklady Farmaceuticzne "Polfa". Optically active N,N''-dialkyl-N,N'-bis(1-hydroxybutyl-2-)ethylenediamine esters and the salts thereof. 4,021,473, Cl. 260-473.00R.

Economics Laboratory, Inc.: *See—*
Moffat, Robert B.; Nystuen, David L.; and Imdieke, Thomas H., 4,020,865.

Eden, Richard C.: *See—*
Andrews, Austin M., II; Clarke, John E.; Gertner, Edward R.; Longo, Joseph T.; and Eden, Richard C., 4,021,836.

Edin, Ronald E.; and Mathieu, Norman A., to GTE Sylvania Incorporated. Electrical heating element. 4,021,769, Cl. 338-299.000.

Edwards, Syd. Hair cutter comb. 4,020,549, Cl. 30-30.000.

Effinger, David D.; and Evans, Norol T., to Hughes Aircraft Company. Sidelobe blanking system. 4,021,805, Cl. 343-17.2PC.

Efstratis, Ernest. Ventilation extension unit. 4,020,753, Cl. 98-40.00C.

Eggert, Carl A.: *See—*
Ludt, Roy R.; Eggert, Carl A.; and Skarman, John, 4,021,792.

Egyesult Izzolampa Es. Villamossagi Resveny tarsasag: *See—*
Fleischer, Bertalan; Gaal, Otto; Lengyel, Sandor; and Pioker, Gyula, 4,020,534.

Ehret, Rudolf; and Hoyer, Gerhard, to Pfaudler-werke AG. Compensated probe for capacitive level measurement. 4,021,707, Cl. 361-284.000.

Eichenauer, Fritz, to Eichenauer, Fritz. Device for preventing ice formation on parts of aircraft. 4,021,008, Cl. 244-134.00D.

Eichinger, Johann; Strehler, Richard; and Burzlauer, Gert, to Carl Hurth, Maschinen- und Zahnradfabrik. Friction clutch with yieldable hydraulic operator. 4,020,934, Cl. 192-87.170.

Eisele, Wolfgang; Petersen, Harro; Mayer, Johann; and Wittmann, Otto, to BASF Aktiengesellschaft. Production of wood glue. 4,021,413, Cl. 260-69.00R.

Eklof, Karl Vilhelm Evert; and Tingskog, Karl August Lennart, to AB Siwertell. Apparatus for unloading particulate material, especially from ships. 4,020,953, Cl. 214-14.000.

Elderfield, David Henry Theophilus, to Sedco Products Ltd. Diaphragm pumps driven by pulse pistons. 4,021,157, Cl. 417-387.000.

Electric Power Research Institute Inc.: *See—*
Wolk, Ronald H., 4,021,328.

Electronic Fuel Saver, Inc.: *See—*
Hayward, Arthur, 4,020,812.

Elektro-Physik, Hans Nix & Dr. -Ing. E. Steingroever KG: *See—*
Steingroever, Erich, 4,021,763.

Elektrokemiai Muszergyarto Szov.: *See—*
Pungor, Erno; Doktor, Elek; Patko, Marton; Havas, Jeno; and Kecskes, Lajos, 4,021,325.

Elepon Kabushiki Kaisha: *See—*
Matsusaka, Tanechiyo, 4,021,144.

Eli Lilly and Company: *See—*
Lacefield, William B.; and Ho, Peter P. K., 4,021,553.

Eli Lilly Industries Limited: *See—*
Evans, Delme; Dunwell, David William; and Hicks, Terence Alan, 4,021,440.

Elinca S.A.: *See—*
Bercher, Francois L., 4,021,831.

Elliot, Eric: *See—*
Brook, Richard Morley; and Elliot, Eric, 4,021,336.

Elliott Brothers (London) Limited: *See—*
Rawcliffe, John; and Vassie, John McLauchlan, 4,021,724.

Ellis-Anwyl, David R., to Borg-Warner Corporation. Digital logic control system for three-phase submersible pump motor. 4,021,700, Cl. 361-28.000.

Ellis, Gaylord O.: *See—*
Pedersen, Nicholas F.; and Ellis, Gaylord O., 4,021,135.

Ellsworth, Archibald B.; Mayberry, Douglas W.; Roden, William A.; and Roye, Cleveland E., to General Dynamics Corporation. Seam tracking welding system. 4,021,840, Cl. 358-101.000.

Elmendorp, Jan: *See—*
De Rooij, Abraham H.; and Elmendorp, Jan, 4,021,422.

Elmer, Ben R.; and Tchon, Wallace E., to Honeywell Information Systems, Inc. Charge detectors for CCD registers. 4,021,682, Cl. 307-362.000.

Elter, John F., to Xerox Corporation. Radiant fuser for fixing toner images. 4,021,641, Cl. 219-216.000.

Emeis, Reimer: *See—*
Reuschel, Konrad; Keller, Wolfgang; Kersting, Arno; and Emeis, Reimer, 4,020,791.

Emerson & Cuming, Inc.: *See—*
Copley, John R., 4,021,589.

Emhart Zurich S.A.: *See—*
Krenmayr, Willy, 4,021,122.

Ems, Herbert A.: *See—*
Vautrain, Lucien H.; and Ems, Herbert A., 4,021,201.

Engel, Wolfhard: *See—*
Seeger, Ernst; Engel, Wolfhard; Nickl, Josef; and Teufel, Helmut, 4,021,479.

Engelhard Minerals & Chemicals Corporation: *See—*
Hindin, Saul G.; and Dettling, Joseph C., 4,021,185.

Engelhardt, Albrecht: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; Engelhardt, Albrecht; and Taunecker, Werner, 4,021,576.

Engelhardt, Gunther: *See—*
Schmidt, Gunther; Engelhardt, Gunther; and Puschmann, Sigfrid, 4,021,557.

Engineered Plastics, Incorporated: *See—*
Poteat, George A., 4,021,004.

English, David C.; McCauley, Jerry L.; and Holmstrom, Godfrey A., to Structural Instrumentation, Inc. Load cell scale. 4,020,911, Cl. 177-136.000.

Enomoto, Kazuyoshi: *See—*
Hino, Masamichi; Fukui, Kou; Kashitani, Tsuneo; Enomoto, Kazuyoshi; and Hijikata, Setsuo, 4,020,912.

Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Alkyd resin composition comprising a 1,1-bis(1'-methyl-2'-vinyl-4',6'-heptadienoxy)alkane. 4,021,390, Cl. 260-22.0CB.

Enter, William L. Automatic interior environment control. 4,020,897, Cl. 165-12.000.

Epoch Company, Ltd.: *See—*
Matsumoto, Teruo, 4,021,044.

Epstein, Arnold S.; Share, Stewart; and Polimadei, Roland A., to United States of America, Army. Radiation-resistant integrated optical signal communicating device. 4,021,834, Cl. 357-19.000.

Epstein, Michael, to Bendix Corporation, The. Redundant inertial measurement system configuration. 4,020,702, Cl. 74-5.340.

Erdman, Frank H., to Tropicana Products, Inc. Bottle inspection device. 4,020,949, Cl. 209-73.000.

Erickson, John Joseph; Leland, Harold Lester; and Mathisen, Einar Skau, to International Business Machines Corporation. Article positioner with zero position sensing means. 4,021,711, Cl. 318-480.000.

Erickson Tool Company: *See—*
Benjamin, Milton Lloyd; and Miles, Wilbur Nelson, 4,021,132.

Ericson, John E., Jr., to Ericson Manufacturing Company, The. Electrical connector. 4,021,092, Cl. 339-103.00R.

Ericson Manufacturing Company, The: *See—*
Ericson, John E., Jr., 4,021,092.

Erikson, Robert W.; and Harwath, Frank L., to Sundstrand Corporation. Oil burner pumping system with air purging valve. 4,021,155, Cl. 417-302.000.

Eriksson, Lars Anders: *See—*
Johnsson, Mans Klas Olof; and Eriksson, Lars Anders, 4,021,233.

Erling, Frank H.: *See—*
Weber, Albert J.; Erling, Frank H.; and Bearfield, Clair A., 4,021,028.

Eross, Bela: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Siposs, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.

Erwin Sick GmbH Optik-Electronik: *See*—
Haas, Klaus Dieter; and Sillmann, Manfred, 4,021,665.
Eskridge, Marshall: *See*—
Willson, James K. V.; and Eskridge, Marshall, 4,020,829.
Espino, Jesse M. Device for use in installing wax foundations in bee frames. 4,021,639, Cl. 219-201.000.
Etablissemen s Celant Gazuit: *See*—
Harmant, Michel Engineer, 4,020,598.
Etoh, Jun; and Masuhara, Toshiaki, to Hitachi, Ltd. Semiconductor device and a method for fabricating the same. 4,021,835, Cl. 357-23.000.
Evans, Delme; Dunwell, David William; and Hicks, Terence Alan, to Eli Lilly Industries Limited. Cyanomethyl substituted benzoxazoles. 4,021,440, Cl. 260-307.00D.
Evans, Norol T.: *See*—
Effinger, David D.; and Evans, Norol T., 4,021,805.
Evans Products Company: *See*—
Ceyer, Alfons W., 4,020,594.
Everitt, Delmar K.: *See*—
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Friedrich, Richard D., 4,021,041.
Evg Entwicklungs-u Verwertungsgesellschaft, Firma: *See*—
Gott, Hans; and Ritter, Josef, 4,020,669.
Gott, Hans; Ritter, Josef; Ritter, Klaus; Ritter, Gerhard; Zechner, Gottfreid; and Schmidt, Gerhard, 4,021,634.
Ex-Cell-O Corporation: *See*—
Ebert, Gary R., 4,021,133.
Exxon Nuclear Company, Inc.: *See*—
Welty, Richard K.; Robinson, Dan L.; and Deveraux, Harry R., 4,020,673.
Exxon Research and Engineering Company: *See*—
Climo, Benjamin G., 4,020,725.
Tenner, Arthur R., 4,021,186.
F. L. Smidth & Co.: *See*—
Sylvest, Karl Jens, 4,021,195.
F. Lli Sandretto S.a.s.: *See*—
Brocchi, Mario, 4,020,709.
F. & M. Schaefer Brewing Company, The: *See*—
Raymond, Leonard; Bockelmann, John B.; and Tirado, William, Jr., 4,021,580.
Fabian, Ralf. Hospital bed reading and writing device. 4,020,510, Cl. 5-332.000.
Fabish, Donald C., to Robertshaw Controls Company. Fluid pressure regulator construction. 4,020,863, Cl. 137-116.500.
Facet Enterprises, Inc.: *See*—
Mortensen, Harold Richard, 4,020,935.
Fafco Incorporated: *See*—
Steed, Michael Halsey, 4,020,828.
Fahnestock, Melvin R.: *See*—
Binger, Wayne W.; Collins, John W., III; Fahnestock, Melvin R.; and Stuppy, George H., 4,020,992.
Fairchild Camera and Instrument Corporation: *See*—
Peterson, Harry W., 4,021,786.
Fairfax, Gerald Henry: *See*—
James, Emrys Craig; and Fairfax, Gerald Henry, 4,021,615.
Falkowski, Donald Russell: *See*—
Shay, Joseph John; and Falkowski, Donald Russell, 4,020,979.
Fargo Mfg. Company, Inc.: *See*—
Fredericksen, Arthur E., 4,021,090.
Farrington, Michael: *See*—
Skelly, James Kenneth; and Farrington, Michael, 4,021,059.
Farris, Walter. Electronic digital radial and electro immunodiffusion calibrating viewer. 4,021,200, Cl. 23-253.00R.
Fawcett, James M., Jr.; and Stillman, Ronald G., to Detect-All Security Systems, Inc. Pushbutton purmutation code control means for a security alarm system. 4,021,796, Cl. 340-274.00C.
Fechter, Harry Robert; and Walker, George Brown. Pipeline leak detector with baffles. 4,020,674, Cl. 73-40.50R.
Federal-Mogul Corporation: *See*—
Binkley, Howard J. R., 4,021,209.
Fee International, Ltd.: *See*—
O'Hara, Patrick L., 4,021,035.
Feldcamp, Edward George. Milling machines with pivotal head. 4,020,743, Cl. 90-13.300.
Fellows, Mark, to North American Philips Corporation. Method of an device for non-destructive pressure measurement of fluorescent lamps. 4,021,727, Cl. 324-20.00R.
Ferdus, Stanislav: *See*—
Spisiak, Juraj; Jansa, Milos; Bezdek, Miloslav; and Ferdus, Stanislav, 4,020,877.
Ferguson, Jack A.; and Korn, Clarence D., to Reynolds Metals Company. Furnace system for and method of melting and preheating metal. 4,021,192, Cl. 432-13.000.
Ferguson, James S. Multiple interlocking panel desk. 4,021,087, Cl. 312-195.000.
Ferranti, Limited: *See*—
Brown, Kenneth Robson; Holmes, James; and Whyman, Richard David, 4,020,701.
Goodall, Laurence; and Leaton, Eric John, 4,021,685.
Fiberwoven Corporation, The: *See*—
Smith, Alexander M., II, 4,021,593.
Fichte, Frank; and Paul, Wolfgang, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Sheet feed method and apparatus. 4,021,030, Cl. 271-11.000.
Fichte, Frank; and Paul, Wolfgang, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Speed control system for a continuously operating sheet feeder. 4,021,710, Cl. 318-39.000.
Field, Edwin L.; Lamantia, Charles R.; Lunt, Richard R.; Oberholtzer, James E.; and Valentine, James R., to Combustion Equipment Associates, Inc. Apparatus for removing sulfur dioxide from stack gases. 4,021,202, Cl. 23-260.000.
Fielding, Harold Crosbie; Hutchinson, John; and Webster, Samuel John, to Imperial Chemical Industries Limited. Fire-fighting foam compositions. 4,020,903, Cl. 169-47.000.
Fields, George, Jr., to General Electric Company. Oven exhaust system for range with solid cooktop. 4,021,642, Cl. 219-391.000.
Fischer, Adolf, to BASF Aktiengesellschaft. Herbicide. 4,021,223, Cl. 71-88.000.
Fischer, Adolf, deceased (by Fischer, Caecilia Emma, heiress-at-law); Hansen, Hanspeter; and Rohr, Wolfgang, to BASF Aktiengesellschaft. Thiol carbamates. 4,021,222, Cl. 71-88.000.
Fischer, Caecilia Emma, heiress-at-law: *See*—
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,021,222.
Fischer, Joachim: *See*—
Knorre, Helmut; and Fischer, Joachim, 4,021,264.
Fischer, Peter. Electrodynamic force measuring apparatus. 4,020,687, Cl. 73-141.00R.
Fischer, Robert Frederick: *See*—
Bobeck, Andrew Henry; and Fischer, Robert Frederick, 4,021,791.
Fischer, Roman: *See*—
Goetz, Norbert; and Fischer, Roman, 4,021,411.
Preugschas, Helmut; Daubach, Ewald; Fischer, Roman; and Herrmann, Manfred, 4,021,226.
Fischli, Albert Eduard; Klaus, Michael Josef; Mayer, Hans Johann; and Wick, Alexander Eduard, to Hoffmann-La Roche Inc. 4-Benzyloxymethyl-5-[(1-pyrrolidinyl-carbonyl)-methyl]-1,3-cyclopentylene-diacetate compounds. 4,021,446, Cl. 260-326.400.
Fisk, Allan T.: *See*—
Peterson, Carl R.; and Fisk, Allan T., 4,020,910.
Fleischer, Bertalan; Gaal, Otto; Lengyel, Sandor; and Pioker, Gyula, to Egyesult Izzolampa Es. Villamossagi Resveny tarsasag. Apparatus for monitoring stems of electrical light sources during manufacture. 4,020,534, Cl. 29-25.110.
Fliege, Werner: *See*—
Horn, Peter; Teege, Gernot; Fliege, Werner; Weiss, Frank; and Meissner, Bernd, 4,021,408.
Flow Star Industries Inc.: *See*—
Illes, Charles P., Jr., 4,020,980.
Floyd, Middleton Brawner, Jr., to American Cyanamid Company. 2,5-Dihydro-2,5-dialkoxyfuran derivatives. 4,021,452, Cl. 260-347.300.
FMC Corporation: *See*—
Austill, Robert J., 4,020,603.
Bailey, Kenneth E., 4,020,804.
Billett, Ronald J.; and Harper, Bruce M., 4,020,879.
Lee, Fui-Tseng H., 4,021,361.
McKeon, John F.; and Lambert, Roy E., 4,020,712.
Wood, Nyal B., 4,020,943.
Fontanet, Pierre: *See*—
Malphettes, Jean; and Fontanet, Pierre, 4,020,859.
Foody, Patrick. Water filter. 4,021,339, Cl. 210-80.000.
Ford Aerospace & Communications: *See*—
Kaufman, Warren F., 4,021,511.
Ford, David Norman, to ICI Australia Limited. Polyester elastomeric particles. 4,021,507, Cl. 260-873.000.
Ford Motor Company: *See*—
Bradley, John E., 4,020,634.
Louis, Charles R.; and Ulanski, Lawrence J., 4,020,960.
Willyard, John J., 4,021,085.
Fort, J. Robert; Westphal, James A.; and Juilfs, Donald R., to Geophysical Systems Corporation. Data compositing and array control system. 4,021,649, Cl. 235-151.300.
Foulkes, Stanley Charles, to Chloride Group Limited. Manufacture of battery plates. 4,020,882, Cl. 141-1.100.
Fournier, Jacques; and Thuries, Edmond, to Delle-Alsthom. Device for dissipating the accidental over-pressure of a fluid. 4,020,860, Cl. 137-69.000.
Fowler, Allan R.; and Bolls, Alfred W., to Duovel Company. Carrier accessory for use with record discs on phonographs. 4,021,048, Cl. 274-1.00R.
Fowler, Harry H. Shackle for securing vehicle steering column ignition lock against burglary. 4,020,662, Cl. 70-237.000.
Fozzard, George B.; and Norell, John R., to Phillips Petroleum Company. Unsaturated dinitrile preparation. 4,021,465, Cl. 260-465.80R.
Frame, Ronald A. Circle cutter. 4,021,025, Cl. 266-58.000.
Francioni, Armando. Construction of fire extinguishers. 4,020,905, Cl. 169-76.000.
Francisco, James R., to Frank W. Murphy Manufacturer, Inc. Self-cleaning electrical contact for gages. 4,021,627, Cl. 200-56.00R.
Frank, Anton; Karn, Helmut; and Dockner, Toni, to BASF Aktiengesellschaft. Production of 1-alkyl-5-nitroimidazoles. 4,021,442, Cl. 260-309.000.
Frank Speno Railroad Ballast Cleaning Co. Inc.: *See*—
Panetti, Romolo, 4,020,599.
Panetti, Romolo, 4,020,599.
Frank W. Murphy Manufacturer, Inc.: *See*—
Francisco, James R., 4,021,627.

Franke, Kurt, to Siemens Aktiengesellschaft. Dental X-ray diagnostic installation. 4,021,672, Cl. 250-402.000.

Franke, Walter: *See—*
Zindikus, Walter; Krobel, Heinz; and Franke, Walter, 4,021,113.

Frankische Isolierrohr-und Metallwarenwerke Gebr. Kirchner: *See—*
Braun, Franz Josef, 4,021,178.

Franklin, Cecil, to Simmonds Precision Products, Inc. D.C. signal currents in capacitance gaging systems. 4,020,691, Cl. 73-304.00C.

Franklin, Clifford John, to Brown Boveri Sulzer Turbomachinery, Ltd. Gas turbine guide vane. 4,021,139, Cl. 416-97.00R.

Franklin, Richard Arthur: *See—*
White, Alan Chapman; and Franklin, Richard Arthur, 4,021,550.

Frazerhurst, Lyndon F.; Robinson, Anthony J.; and Macfarlane, Peter G., to New Zealand Inventions Development Authority. Method of and means for liquid extraction from gall bladders. 4,020,993, Cl. 241-24.000.

Fredericksen, Arthur E., to Fargo Mfg. Company, Inc. Ground wire connector. 4,021,090, Cl. 339-5.00R.

Frei, Gerhard, to Siemens Aktiengesellschaft. Nuclear reactor installation. 4,021,301, Cl. 176-37.000.

Freimuth, Gerhart William; and Weiner, Jerold Samuel, to Gerhart Engineering and Machine Co. Piston pump mechanism. 4,020,750, Cl. 92-205.000.

Freytag, Arthur H.; and Akeson, Walter R., to Great Western Sugar Company, The. Method for reduction of sucrose loss during storage or sugar beets due to reduction in respiration and invert sugar formation. 4,021,231, Cl. 71-127.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Koslowski, Gunter, 4,021,350.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Arndt, Friedrich Karl, 4,020,746.

Friede, Allen J.: *See—*
Phelps, Elmer B.; and Friede, Allen J., 4,021,049.

Friedrich Kocks, Firma: *See—*
Demny, Werner; and Moeltner, Hermann, 4,020,667.

Frierdich, Richard D.: *See—*
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,021,041.

Friese, Karl-Hermann: *See—*
Pollner, Rudolf; Friese, Karl-Hermann; Topp, Bernhard; and Neidhard, Horst, 4,021,326.

Frisch, Kurt Charles; and Russell, Donald Henry, to Atlantic Richfield Company. Microcellular foams. 4,021,378, Cl. 260-2.5BE.

Friz, Walter: *See—*
Doehler, Oskar; Dohler, Gunter; and Friz, Walter, 4,021,697.

Fromknecht, Charles T.; and Carnes, Donald W., to Singer Company, The. Vacuum cleaner filter bag condition indicator. 4,020,525, Cl. 15-339.000.

Fromson, Howard A. Process of making electroplated anodized aluminum articles and electroless plating. 4,021,592, Cl. 428-209.000.

Fuchs, Francis Joseph, Jr.; and Shaffer, John Richard, to Western Electric Co. High pressure hydraulic system. 4,021,156, Cl. 417-346.000.

Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, to Sony Corporation. Bath for the electrodeposition of bright tin-cobalt. 4,021,316, Cl. 204-43.00S.

Fuji Photo Film Co., Ltd.: *See—*
Furutachi, Nobuo; and Arai, Atsuaki, 4,021,428.
Hayashi, Jun; Kato, Takeshi; and Arai, Atsuaki, 4,021,238.
Hinata, Masanao; and Mihara, Yuji, 4,021,247.
Ichii, Hirokazu, 4,021,827.
Kiritani, Masataka; Matsukawa, Hiroharu; Watanabe, Akio; and Imamiya, Hitoshi, 4,021,595.
Nagatomo, Shigeru; and Hori, Kiyotaka, 4,021,244.
Nagatomo, Shigeru; and Hori, Kiyotaka, 4,021,245.
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,021,249.
Sashihara, Kenji; Masuda, Takao; Yamashita, Hiroshi; and Noguchi, Yasuhiro, 4,021,250.
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,021,251.
Shiba, Keisuke; Nakazyo, Kiyoshi; Ohi, Reiichi; and Adachi, Keiichi, 4,021,248.

Fuji Sangyo Co., Ltd.: *See—*
Kojima, Hiromitsu; and Yoshida, Kimio, 4,020,944.

Fujii, Kancharu. Apparatus for tightening high-strength steel bolts. 4,020,720, Cl. 81-57.380.

Fujii, Setsuro; Uegai, Yoshiaki; Watanabe, Tsuyoshi; and Kayama, Naohiro, to Ono Pharmaceutical Co., Ltd. Guanidinobenzoic acid derivatives. 4,021,472, Cl. 260-472.000.

Fujimoto, Yasuo; Nakano, Kinichi; and Urakawa, Chikahiro, to Kyowa Hakko Kogyo Co., Ltd. Derivatives of mitomycin C. 4,021,449, Cl. 260-326.240.

Fujita, Tadashi; Chiba, Takehisa; and Horiuchi, Masato, to Santen Pharmaceutical Co. Ltd. Method for detecting cystine and cysteine. 4,021,198, Cl. 23-230.00B.

Fujitsu Ltd.: *See—*
Hinoshita, Shigehiko; and Minezima, Yukihiko, 4,021,799.
Oyama, Mitsukazu; Tada, Yoshiro; and Sakamoto, Yasuhiko, 4,021,609.

Fujiwara, Hiroshi; and Suzuki, Hiroshi, to Maruzen Oil Co. Ltd. Flame resistant thermosetting resin composition and metal clad laminate composed of the thermosetting resin composition. 4,021,403, Cl. 260-42.280.

Fukui, Kou: *See—*
Hino, Masamichi; Fukui, Kou; Kashitani, Tsuneo; Enomoto, Kazuyoshi; and Hijikata, Setsuo, 4,020,912.

Fukunaga, Hideki: *See—*
Oda, Hiroshi; and Fukunaga, Hideki, 4,020,646.

Fukuoka, Tatsuo. Sole of a footwear. 4,020,569, Cl. 36-29.000.

Fulton, Fred J.: *See—*
Rinde, James A.; and Fulton, Fred J., 4,021,280.

Furman, Anatol; Kalter, Howard Leo; and Nagel, Johann Werner, to International Business Machines Corporation. Self-aligned integrated circuits. 4,021,789, Cl. 340-173.00R.

Furuishi, Haruhisa; Kawamoto, Katsuaki; and Koyama, Yoneji, to Matsushita Electric Industrial Co., Ltd. Charging system. 4,021,717, Cl. 320-39.000.

Furutachi, Nobuo; and Arai, Atsuaki, to Fuji Photo Film Co., Ltd. 4-Piperidino-5-oxo-2-pyrazolines. 4,021,428, Cl. 260-293.700.

Fusetti, Federico. Fishing rod with heated handle. 4,020,825, Cl. 126-206.000.

G. D. Searle & Co.: *See—*
Muir, Robert D.; and Sangar, Vijay K., 4,021,305.

G. D. Societa per Azioni: *See—*
Seragnoli, Enzo, 4,020,608.

Gaal, Otto: *See—*
Fleischer, Bertalan; Gaal, Otto; Lengyel, Sandor; and Pioker, Gyula, 4,020,534.

Gabrielsen, Rolf Steven: *See—*
Cerquone, Felice Mary; Gabrielsen, Rolf Steven; and Willis, Roland George, 4,021,240.

Gaio, Pietro: *See—*
Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, 4,021,477.

Gajjar, Bharat Jaybhadra, to Du Pont de Nemours, E. I., and Company. Method of warp knitting. 4,020,654, Cl. 66-125.00R.

Gajjar, Bharat Jaybhadra, to Du Pont de Nemours, E. I., and Company. Method of warp knitting. 4,020,656, Cl. 66-213.000.

Gal, Sandor; Eross, Bela; Pungor, Erno; Sipos, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, to Budapesti Muszaki Egyetem; and Peti Nitrogenmuvek. Process for recovering suspended metal catalyst from their suspension. 4,021,367, Cl. 252-411.00R.

Gamvrellis, Steve. Fabric marker. 4,020,789, Cl. 118-308.000.

Gancy, Alan B.; and Poncha, Rustom P., to Allied Chemical Corporation. Soluble silicate reduction in calcined trona liquors. 4,021,526, Cl. 423-184.000.

Gandolfi, Carmelo; Doria, Gianfederico; and Gaio, Pietro, to Carlo-Erba S.p.A. 14-Chloro prostadienoic acid compounds. 4,021,477, Cl. 260-514.00D.

Gandon, Louis; and Cheneau, Gilbert, to Le Nickel. Process for the production of hydrated nickel sulphate. 4,021,532, Cl. 423-544.000.

Gangwer, James R.: *See—*
Delony, Timothy Edwin; Gangwer, James R.; and Monthony, James F., 4,021,324.

Gardner, Edward M.: *See—*
Kirby, Paul J.; and Gardner, Edward M., 4,021,785.

Gardner, Jeff A.: *See—*
Gardner, Marshall J.; and Gardner, Jeff A., 4,020,946.

Gardner, Marshall J.; and Gardner, Jeff A. Display and dispensing carton structure and blank therefor. 4,020,946, Cl. 206-45.160.

Gardner, Peter Lycett, to International Business Machines Corporation. Microprogram control units. 4,021,779, Cl. 340-172.500.

Garner, Lloyd L. Drilling bit bearing structure. 4,021,084, Cl. 308-8.200.

Garroway, Allen Nathan; Grannell, Peter Kevin; and Mansfield, Peter, to National Research Development Corporation. Image formation using nuclear magnetic resonance. 4,021,726, Cl. 324-.50A.

Gary, Wardell; Taylor, Glenn R.; and Kimmel, Donald S., to Westinghouse Electric Corporation. Phase imbalance detection circuit. 4,021,703, Cl. 361-85.000.

Gaspari, Tiberio. Ophthalmic mounting arrangements. 4,021,103, Cl. 351-126.000.

Gasparro, Luigi; and Brunetti, Luciano. Jointing element for a compoundable unit structure, and a structure using said jointing element. 4,021,127, Cl. 403-171.000.

Gassner, Hans; and Lang, Otto, to Kugelfischer Georg Schafer & Co. Friction disc for false twisting devices. 4,020,710, Cl. 74-206.000.

Gatlyn, Jennings B. Snag-proof fishing lure. 4,020,583, Cl. 43-42.410.

Gaussens, Gilbert: *See—*
Cournut, Rene; and Gaussens, Gilbert, 4,020,558.

Gay, Michael J., to Motorola, Inc. Control circuit for a matrixed four channel audio reproducing system. 4,021,610, Cl. 179-1.0VL.

Gaynor, Joseph, to Bell & Howell Company. Apparatus for electrostatic reproduction using plural charges. 4,021,106, Cl. 355-3.00R.

Gebrueder Buehler AG: *See—*
Resch, Heinz, 4,021,182.

Geier, Roland: *See—*
Bohnlein, Friedrich; and Geier, Roland, 4,020,862.

Gelbard, Robert B.: *See—*
True, Howard D. F., Jr.; Merryman, Bob D.; and Gelbard, Robert B., 4,020,644.

General Dynamics Corporation: *See—*
Ellsworth, Archibald B.; Mayberry, Douglas W.; Roden, William A.; and Roye, Cleveland E., 4,021,840.

General Electric Company: *See—*
Anthony, Thomas R.; Chang, Mike F.; and Cline, Harvey E., 4,021,269.
Davis, Donald H.; and Mossey, John G., 4,020,869.

Dennis, Ronald E.; Treece, William D.; and Corsmeier, Robert J., 4,020,538.
Fields, George, Jr., 4,021,642.
Konrad, Charles Edward, 4,021,718.
True, Howard D. F., Jr.; Merryman, Bob D.; and Gelbard, Robert B., 4,020,644.
Wiley, Emmett H., 4,021,659.
Winn, Oliver H., 4,021,764.
General Foods Corporation: *See—*
Rankowitz, Marshall Miles, 4,021,584.
General Refractories Company: *See—*
Turner, Charles L., 4,021,134.
General Signal Corporation: *See—*
Bohusch, Glen O., 4,021,079.
General Tire & Rubber Company, The: *See—*
Dailey, Charles R., 4,021,168.
Genkin, Mikhail Dmitrievich: *See—*
Kudinov, Valentin Georgievich; and Genkin, Mikhail Dmitrievich, 4,021,688.
Genova, Inc.: *See—*
Pepper, Kenneth V., 4,021,145.
Genovese, Nunzio. Eyeless fishing rod. 4,020,581, Cl. 43-18.0GF.
Geophysical Systems Corporation: *See—*
Fort, J. Robert; Westphal, James A.; and Juilfs, Donald R., 4,021,649.
Gerhart Engineering and Machine Co.: *See—*
Freimuth, Gerhart William; and Weiner, Jerold Samuel, 4,020,750.
Geringer, Arthur V. Electric lock. 4,021,065, Cl. 292-144.000.
Gertner, Edward R.: *See—*
Andrews, Austin M., II; Clarke, John E.; Gertner, Edward R.; Longo, Joseph T.; and Eden, Richard C., 4,021,836.
Gesellschaft fur Kernforschung m.b.H.: *See—*
Hausberger, Helmut; Goldacker, Hubert; and Schmieder, Helmut, 4,021,313.
Ghirga, Marcello: *See—*
Piccolo, Luigi; Ghirga, Marcello; and Paolinelli, Antonio, 4,021,533.
Gianantonio, Anacleto: *See—*
Oppici, Ernesto; and Gianantonio, Anacleto, 4,021,426.
Giese, Erik O.: *See—*
Gross, Alexander Louis; and Giese, Erik O., 4,021,640.
Giglia, Robert Domenico, to American Cyanamid Company. Electrochromic device having an electrolyte contained in a solid porous insulating layer. 4,021,100, Cl. 350-160.00R.
Gill, Raymond E., to Westinghouse Air Brake Company. Fluid operated clutch with dual pistons. 4,020,933, Cl. 192-86.000.
Gilles, Jean-Roger; and Woehrn, Daniel, to Thomson-CSF. Photosensitive diode array storage target. 4,021,844, Cl. 357-31.000.
Gillis, Jay C.; and Holcombe, Norman, to Institute of Gas Technology. Arrangement and method of burner ignition. 4,021,183, Cl. 431-2.000.
Gilman, William S.; Jones, John L.; and Rubino, Andrew M., to Armour Pharmaceutical Company. Aqueous latex emulsions containing basic aluminum compounds of wood-stain reducing agents. 4,021,398, Cl. 260-29.6MM.
Girling Limited: *See—*
Harries, David Anthony, 4,020,636.
Githens, Charles J.: *See—*
Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., 4,021,355.
Gitlin, Richard Dennis; and Magee, Francis Robert, Jr., to Bell Telephone Laboratories, Incorporated. Adaptive equalizer with fast convergence properties. 4,021,738, Cl. 325-323.000.
Giudicelli, Don Pierre Rene Lucien; and Najer, Henry, to Synthelabo. Method for treating sickle-cell anemia. 4,021,559, Cl. 424-262.000.
Giudicelli, Don Pierre Rene Lucien: *See—*
Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, 4,021,567.
Givaudan Corporation: *See—*
Virgilio, Joseph A.; and Manowitz, Milton, 4,021,471.
Givens, Edwin N.: *See—*
Plank, Charles J.; Rosinski, Edward J.; and Givens, Edwin N., 4,021,502.
Givens, William R.; and Lemme, Charles D., to Maremont Corporation. Catalytic converter for purifying gases. 4,021,203, Cl. 23-288.0FC.
Glaesel, Gottfried, to Hego Electric G.m.b.H. Connection frame for electrical installations. 4,021,093, Cl. 339-198.00H.
Glanvall, Rune; Kalen, Hans; and Pettersson, Kurt, to Stal-Refrigeration AB. Rotary vane compressor with increased outlet through-flow area. 4,021,166, Cl. 418-183.000.
Glass, Coy M., deceased; and Dante, James G., to United States of America, Army. Light activated fuze. 4,020,765, Cl. 102-70.20R.
Gleason, John. Convertible surfboard. 4,020,782, Cl. 115-70.000.
Globe-Union Inc.: *See—*
Burant, Leonard Joseph, 4,021,597.
Gloviak, John A.; and Rice, Robert D. Tire spinner with dual 4 bar mechanism for spin and brake. 4,020,706, Cl. 74-16.000.
Gloxhuber, Christian: *See—*
Moller, Hinrich; Osberghaus, Rainer; Gloxhuber, Christian; and Braig, Siegfried, 4,021,539.
Godfrey, John N., to Olin Corporation. Polymer coated regenerated cellulose film containing cellulose fibers in the coating. 4,021,594, Cl. 428-303.000.
Goerke, Paul; and Dyhringer, Waldemar S. Apparatus for assembling washer-shaped and elongated components and the like. 4,020,515, Cl. 10-155.00A.
Goetz, Norbert; and Fischer, Roman, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Production of high molecular weight α,β-unsaturated aldehydes. 4,021,411, Cl. 260-601.00R.
Goetzl, Edward J.; and Austen, K. Frank, to President and Fellows of Harvard College. Eosinophilotactic tetrapeptides. 4,021,387, Cl. 260-8.000.
Gohde, Hildegard; and Gohde, Wolfgang. Process for automatic counting and measurement of particles. 4,021,117, Cl. 356-39.000.
Gohde, Wolfgang: *See—*
Gohde, Hildegard; and Gohde, Wolfgang, 4,021,117.
Goldacker, Hubert: *See—*
Hausberger, Helmut; Goldacker, Hubert; and Schmieder, Helmut, 4,021,313.
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., to Goldfarb, Adolph E.; and Benkoe, Erwin. Throw and catch toy. 4,021,041, Cl. 273-106.50R.
Goldin, Gerald. Shock absorber. 4,020,929, Cl. 188-321.000.
Golomazov, Viktor Andreevich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.
Golubentsev, Jury Sergeevich: *See—*
Dukshtau, Alexandr Antonovich; Prutkovsky, Samuil Alexandrovich; Detinko, Felix Moiseevich; Golubentsev, Jury Sergeevich; and Lurie, Alexandr Nesanelevich, 4,021,691.
Gomez, Albert, to Spiral Binding Company, Inc. Apparatus for binding loose sheets. 4,020,516, Cl. 11-1.00A.
Goodall, Laurence; and Leaton, Eric John, to Ferranti, Limited. Pulse circuit for reshaping long line pulses. 4,021,685, Cl. 307-268.000.
Goodyear Tire & Rubber Company, The: *See—*
Conrad, Daniel T.; Mast, William C.; and Wathen, Tom M., 4,021,504.
Cox, William L., 4,021,404.
Houck, Stanley J.; and Smith, Michael W., 4,020,719.
Saracsan, Jeffrey W., 4,021,414.
Gorchakov, Mikhail Fedorovich; Kabakov, Mikhail Grigorievich; Kashtanov, Leonid Nikolaevich; Morozov, Viktor Prokofievich; Chuprakov, Jury Ivanovich; and Scherbakov, Vitaly Fedorovich. Servomechanism for pump capacity control. 4,021,154, Cl. 417-218.000.
Gorring, Robert L.; Scott, Eric J. Y.; and Smith, Robert L., to Mobil Oil Corporation. Process for manufacture of stabilized lubricating oil with elemental sulfur. 4,021,334, Cl. 208-211.000.
Gott, Hans; and Ritter, Josef, to Evg Entwicklungs-u Verwertungsgesellschaft, Firma; Ritter, Klaus; and Ritter, Gerhard. Machine for bending bar or rod material. 4,020,669, Cl. 72-294.000.
Gott, Hans; Ritter, Josef; Ritter, Klaus; Ritter, Gerhard; Zechner, Gottfreid; and Schmidt, Gerhard, to Evg Entwicklungs-u Verwertungsgesellschaft, Firma. Mesh welding machine. 4,021,634, Cl. 219-56.000.
Gough, Robert George; and Buescher, Francis Joseph, to Cincinnati Milacron, Inc. Synergistic organotin borate stabilizer compositions and resins containing same. 4,021,407, Cl. 260-45.75J.
Gould Inc., Electric Fuse Division: *See—*
Kozacka, Frederick J.; and Belcher, Richard A., 4,021,765.
Gould, R. L.: *See—*
Valdespino, Joseph M., 4,020,902.
Goulding, Terence; and Orton, Michael Leslie, to Imperial Chemical Industries Limited. Coating composition. 4,021,503, Cl. 260-831.000.
Govig, Robert L.: *See—*
Townsend, Franklin L.; and Govig, Robert L., 4,020,876.
Grabinger, Hans; and Sehring, Richard, to Celamerck GmbH & Co. KG. S-triazines. 4,021,424, Cl. 260-249.800.
Grannell, Peter Kevin: *See—*
Garroway, Allen Nathan; Grannell, Peter Kevin; and Mansfield, Peter, 4,021,726.
Grasshoff, J. Michael, to Polaroid Corporation. Polymerization of sulfur containing compounds in aqueous media utilizing a tetraalkylated azo-bis-acetonitrile. 4,021,417, Cl. 260-79.700.
Grasso, Charles Paul: *See—*
Cross, Barrington; Grasso, Charles Paul; and Walworth, Bryant Leonidas, 4,021,227.
Gray, Robert C. Grinder with wear compensating tool rest. 4,020,601, Cl. 51-238.00R.
Great Western Sugar Company, The: *See—*
Freytag, Arthur H.; and Akeson, Walter R., 4,021,231.
Green, Brian John; and Lees-Smith, Bernard Ivor, to Probe Engineering Company Limited. Moisture meters. 4,021,733, Cl. 324-61.00R.
Green, Michael J., to Schering Corporation. Process for the preparation of 21-halogeno-21-desoxy-17α-acyloxy 20-keto-pregnenes. 4,021,459, Cl. 260-397.450.
Greene, Sanford I., to Micro Pneumatic Logic, Inc. Visual indicator for a fluid operated system. 4,020,784, Cl. 116-114.0PV.
Greenwood, Ruth: *See—*
Tucker, Robert Jerome; and Greenwood, Ruth, 4,021,405.

Greve, Heinz; and Grumer, Peter, to Hauni-Werke Korber & Co., KG. Apparatus for making composite filter plugs. 4,020,751, Cl. 93-77.0FT.

Gribble, R. Parks: *See—*
Collins, H. Dale; Sheen, Edwin M.; and Gribble, R. Parks, 4,021,771.

Grifa, Mary J. Portable animal bathing apparatus. 4,020,796, Cl. 119-158.000.

Griffin, Gerald Joseph Louis, to Coloroll Limited. Synthetic resin sheet material. 4,021,388, Cl. 260-13.000.

Grimm, Gerhard: *See—*
Scholl, Karl Heinz; and Grimm, Gerhard, 4,021,521.

Grimsley, Arvid Kjellsen, to American Can Company. Method of making a collapsible tube with an integral cap. 4,021,524, Cl. 264-242.000.

Grosch, Gottlieb W. Head shaft breaking tool. 4,020,541, Cl. 29-283.000.

Gross, Alexander Louis; and Giese, Erik O., to Comfort Products, Inc. Insulated glove construction. 4,021,640, Cl. 219-211.000.

Gross, Joseph; and Stankowski, Stanley, to Computer Terminal Systems, Inc. Feeding device. 4,021,032, Cl. 271-166.000.

Grossbard, Henry. Brilliantized step cut diamond. 4,020,649, Cl. 63-32.000.

Grosso, Donald S.: *See—*
Asmundsson, Einar; and Grosso, Donald S., 4,021,774.

Grot, Walther Gustav, to Du Pont de Nemours, E. I., and Company. Reinforced cation permeable separator. 4,021,327, Cl. 204-296.000.

Groth, Hugh F.; Bochmann, Carl E.; and Hunt, Guilbert M., to Crane Co. Single lever mixing valve. 4,020,871, Cl. 137-636.100.

Grover, George M., to Q-Dot Corporation. Heat pipe and method and apparatus for fabricating same. 4,020,898, Cl. 165-105.000.

Grumer, Peter: *See—*
Greve, Heinz; and Grumer, Peter, 4,020,751.

Gruppo Lepetit S.p.A.: *See—*
Oppici, Ernesto; and Gianantonio, Anacleto, 4,021,426.

GTE Sylvania Incorporated: *See—*
Barczynski, J. Robert; Deffenbaugh, Milton L.; Hedrick, Melvin R.; and Janssen, Jerry F., 4,021,819.
Duggan, George L., 4,021,694.
Edin, Ronald E.; and Mathieu, Norman A., 4,021,769.
Macey, Frank G., 4,021,684.
Srivastava, Gopal Krishna; and Wheeler, Robert Charles, 4,021,848.
Wheeler, Robert C., 4,021,849.

Guardia, Carl J.: *See—*
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., 4,021,394.

Gubsky, Alexei Alexeevich; Borisevich, Vladimir Karpovich; Volkov, Anatoly Ivanovich; and Molchanjuk, Valery Matveevich. Plant for explosive forming. 4,020,663, Cl. 72-56.000.

Guenther, Robert Patrick, to Bell Telephone Laboratories, Incorporated. Method and apparatus for cleaning tubular structures. 4,021,265, Cl. 134-22.00C.

Guerin, Jean: *See—*
Besson, Paul; Guerin, Jean; Brun, Pierre; and Bakes, Michel, 4,021,531.

Guillemette, Roland J. Musical instrument with prerecorded tones on tape. 4,020,729, Cl. 84-1.280.

Gulf Research & Development Company: *See—*
Hedrich, Loren W.; and Doyle, William C., Jr., 4,021,225.
Kochhar, Rajindar K.; and Rowatt, Robert J., 4,021,599.

Gulf & Western Industries, Inc.: *See—*
Hill, Frank W.; and Hedman, Theodore A., 4,021,793.
Meier, Carl H., 4,021,646.
Meier, Carl H., 4,021,647.

Gulf & Western Manufacturing Company (Systems): *See—*
Solomon, Elias E., 4,021,671.

Gunderlock, Richard P.: *See—*
Scalzo, Augustine J.; and Gunderlock, Richard P., 4,021,138.

Gurnee, Mark N., to Honeywell Inc. Infrared photodiode. 4,021,833, Cl. 357-15.000.

Gyromat Corporation, The: *See—*
Wiggins, Richard F., 4,020,866.

H. H. Robertson Company: *See—*
Kautz, Glenn E., 4,020,989.

H. Nielsen & Son Maskinfabrik A/S: *See—*
Christensen, Hans, 4,020,757.

Haarer, Erich: *See—*
Adam, Karl; and Haarer, Erich, 4,021,497.

Haas, Klaus Dieter; and Sillmann, Manfred, to Erwin Sick GmbH Optik-Electronik. Light beam switch housing structure. 4,021,665, Cl. 250-239.000.

Haavaldsen, Johan: *See—*
Almen, Torsten; Haavaldsen, Johan; and Nordal, Vegard, 4,021,481.

Habermeier, Jurgen: *See—*
Batzer, Hans; and Habermeier, Jurgen, 4,021,506.

Habiby, Emile Najib; and Jahnke, Richard William, to Lubrizol Corporation, The. Method of rerefining oil by distillation and extraction. 4,021,333, Cl. 208-179.000.

Haff, Frederick, Jr. Feeding and cutting attachment for sewing machines. 4,020,776, Cl. 112-121.260.

Hagan, Robert August: *See—*
Eakins, Russell W.; and Hagan, Robert August, 4,020,721.

Hagenuk & Co. GmbH: *See—*
Beermann, Paul, 4,020,764.

Hails, George: *See—*
Milne, Alexander; and Hails, George, 4,021,392.

Haines, Clarence C., Jr.: *See—*
Piotrowski, Casimir F.; Scidmore, Wright H.; O'Shaughnessy, Robert P.; Marasco, Nicholas P.; Cerrato, Louis R.; and Haines, Clarence C., Jr., 4,020,739.

Haines, James Ronald. Variable force bow. 4,020,819, Cl. 124-23.00R.

Halasz, Alexander; and Cohen, David, to Clairol Incorporated. Hydroxyalkyl-amino nitrodiphenylamine compounds useful as hair dyes. 4,021,486, Cl. 260-573.000.

Halcon International, Inc.: *See—*
Becker, Mitchell, 4,021,311.
Brill, William F., 4,021,453.

Hall, Frank Kenneth; and Moore, Ronald D., to O'Dell Manufacturing, Inc. Immersion heater for aquariums. 4,021,643, Cl. 219-523.000.

Hall, James E.; and Williams, Everett H., to United States of America, Energy Research and Development Administration. Wetter for fine dry powder. 4,021,021, Cl. 259-8.000.

Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. 1-Acetyl-3,3-dimethyl-(2-propenyl)cyclohexane. 4,021,488, Cl. 260-586.00R.

Hall, Leslie Carl, Jr.: *See—*
Casciotti, Albert; and Hall, Leslie Carl, Jr., 4,020,540.

Hall-Thermotank Products Limited: *See—*
Haselden, Geoffrey Gordon; and Hundy, Guy Francis, 4,020,642.

Halliburton Company: *See—*
Anderson, Mark O., 4,021,083.
Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., 4,021,355.

Halterman, Kenneth Lowder. Equipment holder. 4,020,985, Cl. 224-5.00R.

Hammond, Ronald D.; and Nichols, Dwight E., to Hoover Ball and Bearing Company. Collapsible container. 4,020,967, Cl. 220-6.000.

Hamon-Sobelco S.A.: *See—*
Langerock, Luc Felix Marie-Louis Ghislain, 4,020,899.

Hancor, Inc.: *See—*
Schmunk, John D., 4,020,868.

Handren, Ralph M.; and McKay, John P., to Arnold Engineering Company. Hysteresis alloy. 4,021,273, Cl. 148-121.000.

Hanes Corporation: *See—*
King, J. Frank; Lathery, Willie M.; and Beamon, Howard L., 4,020,775.

Hannon, Donald F.; and Swingle, George E. Attachment for converting a sheet laminating machine. 4,021,288, Cl. 156-499.000.

Hans Sickinger Co.: *See—*
Sickinger, Albert E., 4,020,617.

Hansen, Hanspeter: *See—*
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,021,222.

Harada, Kunihiro: *See—*
Komatsu, Koei; Harada, Kunihiro; Aotani, Seiji; and Itabashi, Akio, 4,021,259.

Harazaki, Yuji: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.

Harbuck, Linda Ann, to Union Carbide Corporation. Vinyl acetate polymerization inhibitors. 4,021,476, Cl. 260-497.00R.

Harding, Maurice R.; and Teeney, David D. Auto tire cleaning apparatus. 4,020,518, Cl. 15-53.00B.

Hardy, David, to British Turntable Company, Limited. Display turntable for vehicles of different wheel bases. 4,020,767, Cl. 104-35.000.

Harich, Franz P.: *See—*
Harich, Jakob; and Harich, Franz P., 4,021,548.
Harich, Jakob; and Harich, Franz P., 4,021,577.
Harich, Jakob; and Harich, Franz P., 4,021,578.

Harich, Jakob; and Harich, Franz P., to Rush-Hampton, Inc. Disinfectant composition and method for controlling and destroying fungi and bacteria. 4,021,548, Cl. 424-195.000.

Harich, Jakob; and Harich, Franz P., to Rush-Hampton, Inc. Useful product derived from grapefruit pulp and process for preparing the same. 4,021,577, Cl. 424-195.000.

Harich, Jakob; and Harich, Franz P., to Rush-Hampton, Inc. Cosmetic and skin conditioning composition. 4,021,578, Cl. 424-364.000.

Harkin, John M., to Wisconsin Alumni Research Foundation. Method for treating septic tank effluent seepage beds and the like. 4,021,338, Cl. 210-63.00R.

Harmant, Michel Engineer, to Etablissements Zelant Gazuit. Method of measuring the radius of a rotating grinding wheel and device therefor. 4,020,598, Cl. 51-34.00R.

Harper, Bruce M.: *See—*
Billett, Ronald J.; and Harper, Bruce M., 4,020,879.

Harries, David Anthony, to Girling Limited. Master cylinder assemblies. 4,020,636, Cl. 60-547.000.

Harrigan, Paul D.: *See—*
Broberg, Frederick N., 4,020,827.

Harris, Harold F., to Oneida Heater Company, Incorporated (Entire). Multi-fuel forced air furnace. 4,020,822, Cl. 126-110.00R.

Harris, Harvey H.; Lindberg, Victor; and Walsh, Dale M., to Paradyne, Inc. Digital filter. 4,021,654, Cl. 364-724.000.

Harris, Norman; Shevels, Thomas Frederick; and Dennis, Alan James, to Davy Powergas Limited. Fuel gas production. 4,021,370, Cl. 252-437.000.

Harris, William G., Jr.: *See—*
Shumaker, Richard K.; and Harris, William G., Jr., 4,020,780.

Hart, John Charles Humphreys, to Bridon Engineering Limited. Valves. 4,021,016, Cl. 251-324.000.

Hartman, George D., to Merck & Co., Inc. Novel process for the preparation of thiazoles. 4,021,438, Cl. 260-302.00R.

Harwath, Frank L.: *See—*
Erikson, Robert W.; and Harwath, Frank L., 4,021,155.

Hascoe, Norman. Solder preform for use in hermetically sealing a container. 4,020,987, Cl. 228-56.000.

Haselden, Geoffrey Gordon; and Hundy, Guy Francis, to Hall-Thermotank Products Limited. Compression systems and compressors. 4,020,642, Cl. 62-84.000.

Hasenour, James A. Extendible table. 4,020,771, Cl. 108-86.000.

Hashiguchi, Koh: *See—*
Nei, Hiromichi; and Hashiguchi, Koh, 4,021,234.

Hashimoto, Kametaro: *See—*
Niimi, Itaru; Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; and Takahashi, Yoshitaka, 4,021,167.

Hashimoto, Yoshiro: *See—*
Nakajima, Shunichi; and Hashimoto, Yoshiro, 4,020,616.

Hashizume, Nobuo: *See—*
Kataoka, Shoei; Komamiya, Yasuo; Kawashima, Mitsuo; Hashizume, Nobuo; and Tomizawa, Kazutaka, 4,021,680.

Hasler, Rolf: *See—*
Carbonell, Jose; Hasler, Rolf; and Walliser, Roland, 4,020,998.

Hassel, David Robert: *See—*
Seeley, Dunham Briggs; and Hassel, David Robert, 4,021,060.

Hatano, Tetsuo: *See—*
Shibano, Yoshizo; Hatano, Tetsuo; and Ohkura, Toshihiko, 4,021,817.

Hatje, Carl H. J., to Raymond Lee Organization, Inc., The, a part interest. Page turning device. 4,020,733, Cl. 84-503.000.

Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, to Nippon Soken, Inc. Fuel injection system for internal combustion engine. 4,020,802, Cl. 123-32.0EA.

Hattori, Tadashi; Iwata, Toshiharu; and Nakase, Takamichi, to Nippon Soken, Inc. Air-to-fuel ratio control means for carbureter. 4,020,813, Cl. 123-124.00B.

Hattori, Yoshiyuki: *See—*
Suzuki, Mikio; and Hattori, Yoshiyuki, 4,021,058.

Hauldren, H. Morris, to Lamb, W. C. Ultrasonic inspection apparatus for vertical members. 4,020,688, Cl. 73-151.000.

Hauni-Werke Korber & Co., KG: *See—*
Greve, Heinz; and Grumer, Peter, 4,020,751.
Hinz, Werner, 4,020,973.
Schloesser, Andreas; and Ramsch, Gerhard, 4,020,851.

Hausberger, Helmut; Goldacker, Hubert; and Schmieder, Helmut, to Gesellschaft fur Kernforschung m.b.H. Method for purifying actinides which are in low oxidation states. 4,021,313, Cl. 204-1.500.

Havas, Jeno: *See—*
Pungor, Erno; Doktor, Elek; Patko, Marton; Havas, Jeno; and Kecskes, Lajos, 4,021,325.

Hawthorne, Arthur L.; and Hazen, David R., to Consolidation Coal Company. Wire communications channel for a pair of unitized augers. 4,021,076, Cl. 299-56.000.

Hay, Eric Ivan. Miniature simulated tennis game. 4,021,039, Cl. 273-85.00B.

Hayasaka, Toshimi, to Olympus Optical Co., Ltd. Coarse-fine focusing device for precision machinery. 4,020,705, Cl. 74-10.540.

Hayashi, Hiroaki: *See—*
Chiku, Takewo; Ninomiya, Kiyoshi; Yoshida, Takashi; Kogiso, Takeshi; Hayashi, Hiroaki; and Matsui, Noboru, 4,021,255.

Hayashi, Jun; Kato, Takeshi; and Arai, Atsuaki, to Fuji Photo Film Co., Ltd. Process of forming color photographic images. 4,021,238, Cl. 96-22.000.

Hayashi, Yoshimasa: *See—*
Aoyama, Shunichi; and Hayashi, Yoshimasa, 4,020,806.

Hays, John D.: *See—*
Quaif, Richard S.; and Hays, John D., 4,020,939.

Hayward, Arthur, to Electronic Fuel Saver, Inc. Fuel atomizing unit. 4,020,812, Cl. 123-122.00F.

Hazen, David R.: *See—*
Hawthorne, Arthur L.; and Hazen, David R., 4,021,076.

Healey, Robert Albert; and Jeremiah, Thomas Leo, to International Business Machines Corporation. Oversized data detection hardware for data processors which store data at variable length destinations. 4,021,655, Cl. 235-156.000.

Heathcock, William F.: *See—*
Culpepper, Jerry W.; Currie, Harry A.; and Heathcock, William F., 4,021,807.

Hechler, Valentine, IV. Continuous flow ratio monitor. 4,020,977, Cl. 222-145.000.

Heck, Albert. Bow sights and methods of making and using the same. 4,020,560, Cl. 33-265.000.

Heckeroth, Earl T.: *See—*
Dettmer, Edward V.; and Heckeroth, Earl T., 4,021,176.

Hedman, Theodore A.: *See—*
Hill, Frank W.; and Hedman, Theodore A., 4,021,793.

Hedrich, Loren W.; and Doyle, William C., Jr., to Gulf Research & Development Company. Combating unwanted vegetation with 1,3,4-thiadiazole-2-sulfonamides. 4,021,225, Cl. 71-90.000.

Hedrick, John R., to Pevrick Engineering Co., Inc. Connecting mechanism for a saw blade. 4,020,555, Cl. 30-392.000.

Hedrick, Melvin R.: *See—*
Barczynski, J. Robert; Deffenbaugh, Milton L.; Hedrick, Melvin R.; and Janssen, Jerry F., 4,021,819.

Hego Electric G.m.b.H.: *See—*
Glaesel, Gottfried, 4,021,093.

Hehl, Karl. Programmable hydraulic power controls for injection molding machines. 4,020,633, Cl. 60-445.000.

Hehl, Karl. Tie rod connection for die closing unit of injection molding machine. 4,021,181, Cl. 425-450.100.

Heider, Joachim: *See—*
Kutter, Eberhard; Austel, Volkard; Eberlein, Wolfgang; and Heider, Joachim, 4,021,558.

Heilmayr, Peter F.; and Kimbrell, Sol B. Apparatus for the manufacture of siding. 4,021,169, Cl. 425-71.000.

Heinrich, Karl; and Schneider, Fritz, to Hoechst Aktiengesellschaft. Process for the manufacture of filament yarn having protruding filament ends. 4,021,520, Cl. 264-103.000.

Heiser, Jerome Jacob, to Agri-Industries of South Dakota. Vehicle trailer. 4,021,074, Cl. 298-22.00R.

Heitzer, Helmut: *See—*
Beck, Gunther; Doring, Fritz; Heitzer, Helmut; and Holtschmidt, Hans, 4,021,443.

Held, Manfred; and Spies, Johann, to Messerschmitt-Bolkow-Blohm GmbH. Safety arrangement for passengers of a vehicle. 4,021,057, Cl. 280-735.000.

Helffer, Bernard: *See—*
Raisin, Jean-Pierre; and Helffer, Bernard, 4,020,655.

Heller, Martin G.; Cheney, Richard L.; and Kautzmann, Karl H., to Heller, Martin G. Apparatus and method for shaping and cutting integrated circuit components. 4,020,880, Cl. 140-140.000.

Hellmer, George A.: *See—*
Wildman, Claude L.; and Hellmer, George A., 4,020,631.

Henkel & Cie G.m.b.H.: *See—*
Moller, Hinrich; Osberghaus, Rainer; Gloxhuber, Christian; and Braig, Siegfried, 4,021,539.

Henrick, Clive A., to Zoecon Corporation. Aliphatic hydrocarbon 2,4-dienoic acids, esters and derivatives thereof. 4,021,461, Cl. 260-410.90N.

Herback, Istvan Jahnos Gohliart, to Herbacks Industrikonsult. Expansion bolt. 4,020,735, Cl. 85-67.000.

Herbacks Industrikonsult: *See—*
Herback, Istvan Jahnos Gohliart, 4,020,735.

Herdegen, Eleonora: *See—*
Eckstein, Marian; May, Jerzy; Herdegen, Eleonora; and Kulig, Daniel, 4,021,473.

Hernestam, Sven Eric Harry; and Petersen, Erling Niels. Method of treating cardiac arrhythmia with γ-piperidino-butyrophenones. 4,021,563, Cl. 424-267.000.

Hernestam, Sven Erik Harry; Bjork, Anders Karl Konrad; Abramo, Aina Lisbeth; and Kjellberg, Bengt Erik Sigvard, to AB Ferrosan. Neuroleptic piperidine compounds. 4,021,564, Cl. 424-267.000.

Herrmann, Manfred: *See—*
Preugschas, Helmut; Daubach, Ewald; Fischer, Roman; and Herrmann, Manfred, 4,021,226.

Hersh, Alan S., to Nose Cone Manufacturing Co., Inc. Apparatus for reducing aerodynamic drag. 4,021,069, Cl. 296-1.00S.

Hesse, Hans Hermann: *See—*
Ahrens, Gunter; Hesse, Hans Hermann; Beierfuss, Gunter; and Wagner, Erich, 4,020,531.

Hesse, Jurgen: *See—*
Schmidt, Jurgen; and Hesse, Jurgen, 4,021,517.

Hester, Jackson B., Jr., to Upjohn Company, The. 1-[(Allylamino)-methyl]-6-phenyl-4H-S-triazole [4,3-a][1,4]benzodiazepines. 4,021,441, Cl. 260-308.00R.

Hewitt, John T.; and Holtrop, Peter B. J. Diesel engine control means. 4,020,814, Cl. 123-140.0MC.

Hicks, Terence Alan: *See—*
Evans, Delme; Dunwell, David William; and Hicks, Terence Alan, 4,021,440.

Highberger, Gary G., to Reliance Electric Company. Programmable controller. 4,021,783, Cl. 340-172.500.

Hijikata, Setsuo: *See—*
Hino, Masamichi; Fukui, Kou; Kashitani, Tsuneo; Enomoto, Kazuyoshi; and Hijikata, Setsuo, 4,020,912.

Hild, Henry F.; and Manecke, Siegfried E., to Robertshaw Controls Company. Control device having improved terminal means and method of making the same. 4,021,094, Cl. 339-246.000.

Hill, Elgie E. Musical instrument. 4,020,730, Cl. 84-173.000.

Hill, Frank W.; and Hedman, Theodore A., to Gulf & Western Industries, Inc. Detector device for converting A.C. inputs to an D.C. output and a system for using the same. 4,021,793, Cl. 340-248.00A.

Hilscher, Jean-Claude: *See—*
Arnold, Hanfried; Hilscher, Jean-Claude; and Wieske, Reinhold, 4,021,458.

Hinata, Masanao; and Mihara, Yuji, to Fuji Photo Film Co., Ltd. Method of dispersing organic compounds useful in photography. 4,021,247, Cl. 96-94.00R.

Hinata, Masanao: *See—*
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,021,251.

Hindin, Saul G.; and Dettling, Joseph C., to Engelhard Minerals & Chemicals Corporation. Compositions and methods for high temperature stable catalysts. 4,021,185, Cl. 431-7.000.

Hino, Masamichi; Fukui, Kou; Kashitani, Tsuneo; Enomoto, Kazuyoshi; and Hijikata, Setsuo, to Kubota Ltd. Indication apparatus with discrete illuminated projections. 4,020,912, Cl. 177-178.000.

Hinoshita, Shigehiko; and Minezima, Yukihiko, to Fujitsu Ltd. Nonlinear coding system. 4,021,799, Cl. 340-347.0AD.

Hinz, Werner, to Hauni-Werke Korber & Co., KG. Apparatus for

removing rod-shaped articles from a magazine. 4,020,973, Cl. 221-13.000.
Hipple, Glendora, executrix: *See—*
Bulso, Joseph D., Jr.; and Hipple, Robert T., deceased, 4,020,670.
Hipple, Robert T., deceased: *See—*
Bulso, Joseph D., Jr.; and Hipple, Robert T., deceased, 4,020,670.
Hirai, Hironori: *See—*
Tsubata, Kazuo, 4,020,621.
Hiramoto, Minoru: *See—*
Kobayasi, Makoto; and Hiramoto, Minoru, 4,020,908.
Hiraoka New York, Inc.: *See—*
Shames, Jerry, 4,020,570.
Hirokane, Tadashi: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,021,315.
Hirs, Gilles Gerardus, to Stichting Reactor Centrum Nederland. Method of forming groove pattern. 4,021,279, Cl. 156-654.000.
Hirsh, Ivan Y., to Molins Limited. Manufacture of cigarettes. 4,020,675, Cl. 73-41.000.
Hirtz, Russell E.: *See—*
Walters, Robert A.; and Hirtz, Russell E., 4,021,736.
Hitachi, Ltd.: *See—*
Etoh, Jun; and Masuhara, Toshiaki, 4,021,835.
Kojima, Hiroomi; Zama, Hideo; Nomura, Sadao; Tabuchi, Toyoji; and Murata, Ryozo, 4,021,798.
Kuwabara, Kooji; Sugawara, Hiroyuki; and Miyashita, Takao, 4,021,633.
Sakata, Kunihiro, 4,021,648.
Tachibana, Kyozo, 4,021,721.
Takeda, Yasutsugu; Tsunoda, Yoshito; Imagawa, Fumio; Kataoka, Keiji; and Tatsuno, Kimio, 4,021,606.
Taniguchi, Yoshisada; Tsuji, Toshihiko; and Oguino, Masanori, 4,021,843.
Ueda, Hirotada; Uno, Takeshi; and Ikeda, Sadahiro, 4,021,778.
Yoshimura, Masayoshi, 4,021,687.
Hitachi Metals, Ltd.: *See—*
Asai, Yoshiteru; and Yoshizoe, Sumio, 4,021,272.
Makino, Michio; Kawai, Takashi; Takahashi, Ryoji; Kubo, Yoshimi; and Obata, Fumio, 4,021,232.
Ho, Panb-Ting; and Rosen, Arye, to RCA Corporation. Broad-band TRAPATT amplifier having a tapered idler circuit. 4,021,750, Cl. 330-34.000.
Ho, Peter P. K.: *See—*
Lacefield, William B.; and Ho, Peter P. K., 4,021,553.
Hobbs, Stanley: *See—*
Valdespino, Joseph M., 4,020,902.
Hoechst Aktiengesellschaft: *See—*
Andersen, Heinz-Erhardt; and Stangl, Georg, 4,021,170.
Heinrich, Karl; and Schneider, Fritz, 4,021,520.
Schlegel, Albert, 4,021,528.
Steppan, Hartmut; and Ruckert, Hans, 4,021,243.
Hoefer Scientific Instruments: *See—*
Hoefer, Stanton A., 4,020,563.
Hoefer, Stanton A., to Hoefer Scientific Instruments. Slab gel dryer and method. 4,020,563, Cl. 34-48.000.
Hoefke, Wolfgang: *See—*
Losel, Walter; Traunecker, Werner; and Hoefke, Wolfgang, 4,021,547.
Hoerner Waldorf Corporation: *See—*
Roccaforte, Harry I., 4,020,947.
Hoerning, John S. Data compaction system and apparatus. 4,021,782, Cl. 340-172.500.
Hoesch Aktiengesellschaft: *See—*
Klages, Robert; and Kleeschulte, Heinrich, 4,020,892.
Hoffmann-La Roche Inc.: *See—*
Baggiolini, Enrico; Partridge, John Joseph, Jr.; and Uskokovic', Milan Radoje, 4,021,423.
Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, 4,021,574.
Fischli, Albert Eduard; Klaus, Michael Josef; Mayer, Hans Johann; and Wick, Alexander Eduard, 4,021,446.
Lafontaine, George Stanford, 4,021,534.
Hoffmann, Werner; and Baumann, Manfred, to BASF Aktiengesellschaft. Manufacture of 2,6,6-trimethyl-cyclohex-2-en-1-one. 4,021,491, Cl. 260-586.00C.
Hofmeister, Helmut, to Siemens Aktiengesellschaft. Audio frequency power line control system. 4,021,797, Cl. 340-310.00A.
Hogan, Vaughn C.: *See—*
McCartney, Ronald L.; Hogan, Vaughn C.; Landgreen, Eleanor A.; and Bauerkemper, Michael I., 4,021,098.
Holcombe, Norman: *See—*
Gillis, Jay C.; and Holcombe, Norman, 4,021,183.
Hollingsworth, Robert Q. System for indicating depletion of sliver from a sliver can. 4,021,795, Cl. 340-272.000.
Holmes, James: *See—*
Brown, Kenneth Robson; Holmes, James; and Whyman, Richard David, 4,020,701.
Holmstrom, Godfrey A.: *See—*
English, David C.; McCauley, Jerry L.; and Holmstrom, Godfrey A., 4,020,911.
Holosonics, Inc.: *See—*
Collins, H. Dale; Sheen, Edwin M.; and Gribble, R. Parks, 4,021,771.
Holt, Brian; and Randell, Donald Richard, to Ciba-Geigy Corporation. Piperidine derivatives. 4,021,432, Cl. 260-293.640.
Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., to Halliburton Company. Compositions for fracturing well formations. 4,021,355, Cl. 252-8.55R.
Holtrop, Peter B. J.: *See—*
Hewitt, John T.; and Holtrop, Peter B. J., 4,020,814.
Holtschmidt, Hans: *See—*
Beck, Gunther; Doring, Fritz; Heitzer, Helmut; and Holtschmidt, Hans, 4,021,443.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Yagi, Shizuo; and Miyaki, Kiyoshi, 4,020,808.
Honda Motor Co., Ltd.: *See—*
Matsuda, Takayuki; Shimizu, Yoichi; Shimizu, Hiroki; Imazaki, Kazushi; and Nii, Setsuo, 4,021,205.
Honeywell Inc.: *See—*
Gurnee, Mark N., 4,021,833.
Peterson, Dean M., 4,021,821.
Stauffer, Norman L., 4,021,119.
Honeywell Information Systems, Inc.: *See—*
Elmer, Ben R.; and Tchon, Wallace E., 4,021,682.
Hongu, Masayuki: *See—*
Ishigaki, Yoshio; Hongu, Masayuki; and Okada, Takashi, 4,021,749.
Hood, Roderick Kermit; and Raacke, Karl Heinz, to International Business Machines Corporation. Reduced meniscus-contained method of handling fluids in the manufacture of semiconductor wafers. 4,021,278, Cl. 156-626.000.
Hoogovens Ijmuiden B.V.: *See—*
Radstake, Herman; De Jong, Gerrit; and van der Velden, Josephus Hendrikus Maria, 4,021,309.
Hooker Chemicals & Plastics Corporation: *See—*
Pawlak, Joseph A.; and Bajer, Francis J., 4,021,474.
Hoover Ball and Bearing Company: *See—*
Hammond, Ronald D.; and Nichols, Dwight E., 4,020,967.
Terry, Samuel M., 4,020,511.
Hope Plastics Corporation (Entire): *See—*
Hope, William K., 4,020,578.
Hope, William K., to Hope Plastics Corporation (Entire). Night fishing signal. 4,020,578, Cl. 43-17.000.
Hopkins Manufacturing Corporation: *See—*
Mayhew, Theron T., 4,020,694.
Hori, Kiyotaka: *See—*
Nagatomo, Shigeru; and Hori, Kiyotaka, 4,021,244.
Nagatomo, Shigeru; and Hori, Kiyotaka, 4,021,245.
Horiuchi, Masato: *See—*
Fujita, Tadashi; Chiba, Takehisa; and Horiuchi, Masato, 4,021,198.
Horizons Incorporated, a division of Horizons Research Incorporated: *See—*
Bachman, Paul L.; and Adams, John S., Jr., deceased, 4,021,246.
Newyear, Raymond W.; and Lewis, James M., 4,021,242.
Horn, Peter; Teege, Gernot; Fliege, Werner; Weiss, Frank; and Meissner, Bernd, to BASF Aktiengesellschaft. Bis-[4-(m,m'-di-tert.-butyl-p-hydroxyphenyl)-butyl-(2)]dicarboxylic acid esters. 4,021,408, Cl. 260-45.85T.
Horna, Otakar Anthony, to Communications Satellite Corporation (Comsat). Sinewave clock driver with adjustable delay. 4,021,740, Cl. 328-29.000.
Horninger, Karlheinrich: *See—*
Stein, Karl-Ulrich; and Horninger, Karlheinrich, 4,021,787.
Hosaka, Hirokazu; Tanaka, Kunihiko; and Ueda, Yuji, to Sumitomo Chemical Company, Limited. Purification of β-naphthol. 4,021,495, Cl. 260-621.00A.
Hostettler, Hans: *See—*
Legler, George; Hostettler, Hans; Lacoste, Jean-Pierre; and Schwab, Friedrich, 4,020,604.
Houck, Stanley J.; and Smith, Michael W., to Goodyear Tire & Rubber Company, The. Securing a coupling to a hose. 4,020,719, Cl. 81-9.300.
Houlihan, William J.: *See—*
Linder, Jerome; and Houlihan, William J., 4,021,492.
Houskamp, Robert W.; and DeBruine, Carl, to Lear Siegler, Inc. Manually operable automatically controlled vehicle with power steering. 4,020,918, Cl. 180-79.100.
Howa Sangyo Kabushiki Kaisha: *See—*
Oda, Hiroshi; and Fukunaga, Hideki, 4,020,646.
Hoyer, Gerhard: *See—*
Ehret, Rudolf; and Hoyer, Gerhard, 4,021,707.
Hsu, Jau Yann, to Societe d'Assistance Technique pour Produits Nestle S.A. Water-dispersible composition and process for production. 4,021,582, Cl. 426-99.000.
Hubert, Richard D. Engine carburetor air intake heater apparatus. 4,020,815, Cl. 123-142.50R.
Huberts, Leo J. Th. J.; and Verschuur, Eke, to Shell Oil Company. Separating coal particles from water. 4,021,206, Cl. 44-10.00R.
Hudson, Edward C., Jr., to I-T-E Imperial Corporation. Cross-field ground fault sensor. 4,021,729, Cl. 324-51.000.
Hudson, Paul S., to Phillips Petroleum Company. Process for production of phenol and cyclohexanone. 4,021,490, Cl. 260-586.00R.
Huf, Franz, to Dornier System GmbH. Housing formation for a rotary piston machine or trochoidal construction with an outer envelope curve. 4,021,159, Cl. 418-61.00B.
Hug, Franz O., to Ofag Ofenbau-und Feuerungstechnik AG. Process and apparatus for using waste heat of refuse burning installations. 4,020,797, Cl. 122-2.000.
Hughes Aircraft Company: *See—*
Effinger, David D.; and Evans, Norol T., 4,021,805.
Rue, Arthur K., 4,021,716.

Shifrin, Gordon A., 4,021,675.
Hulak, Pavel: *See—*
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, 4,021,368.
Humber, Leslie G.: *See—*
Dobson, Thomas A.; Humber, Leslie G.; Demerson, Christopher A.; and Jirkovsky, Ivo L., 4,021,451.
Humbrol Limited: *See—*
Luff, Stanley Herbert, 4,020,990.
Huml, James O.: *See—*
Layne, Gilbert S.; and Huml, James O., 4,021,530.
Hundy, Guy Francis: *See—*
Haselden, Geoffrey Gordon; and Hundy, Guy Francis, 4,020,642.
Hunt, Guilbert M.: *See—*
Groth, Hugh F.; Bochmann, Carl E.; and Hunt, Guilbert M., 4,020,871.
Hunt, Merrill Roe; Ladas, Christopher Angelos; and Mastroianni, Sal Thomas, to Motorola, Inc. Double master mask process for integrated circuit manufacture. 4,021,270, Cl. 148-1.500.
Hunter, Wood E.; and Vallino, Barney, to Nalco Chemical Company. Method for the concentration of water-in-oil emulsions of water soluble vinyl addition polymers. 4,021,399, Cl. 260-29.60H.
Hurst, Eric Kenneth, to Lewis Woolf Griptight Limited. Infants feeding bottle. 4,020,964, Cl. 215-11.00C.
Hurst, Robert Norman; and Dischert, Robert Adams, to RCA Corporation. Signal defect compensation. 4,021,852, Cl. 360-38.000.
Hutar, William F.; and Marting, Donald G., to Coaltek Associates. Gas jet plug assembly. 4,021,078, Cl. 302-24.000.
Hutchins, William R.: *See—*
Richmond, Martin R.; and Hutchins, William R., 4,021,803.
Hutchinson, John: *See—*
Fielding, Harold Crosbie; Hutchinson, John; and Webster, Samuel John, 4,020,903.
Hutson, Jearld L. Symmetrical semiconductor switch having carrier lifetime degrading structure. 4,021,837, Cl. 357-39.000.
Hyodo, Masakatsu; and Inoue, Hitoshi, to Ashimori Kogyo Kabushiki Kaisha (Ashimori Industry Co., Ltd.). Apparatus for forming coating on a tubular textile jacket. 4,020,790, Cl. 118-44.000.
I-T-E Imperial Corporation: *See—*
Hudson, Edward C., Jr., 4,021,729.
Myers, Felix E.; Ball, Kenneth D.; Michetti, Anthony; and Warner, Charles E., 4,021,632.
Iammarino, Nicholas J.: *See—*
Lindroth, Thomas A.; and Iammarino, Nicholas J., 4,021,389.
Ichii, Hirokazu, to Fuji Photo Film Co., Ltd. Film forwarding means. 4,021,827, Cl. 354-212.000.
ICI Australia Limited: *See—*
Ford, David Norman, 4,021,507.
ICN Pharmaceuticals, Inc.: *See—*
Springer, Robert H.; O'Brien, Darrell E.; and Simon, Lionel N., 4,021,556.
Idra-Pressen G.m.b.H.: *See—*
Bohnlein, Friedrich; and Geier, Roland, 4,020,862.
Iijima, Katsuhiko; and Jomen, Katsumasa, to Mitsubishi Jukogyo Kabushiki Kaisha. Power slide mechanism. 4,020,745, Cl. 91-217.000.
Iinuma, Yoshio: *See—*
Yoshida, Masateru; Iinuma, Yoshio; Yasuda, Tetuya; and Kimura, Satoshi, 4,020,627.
IIT Research Institute: *See—*
Camras, Marvin, 4,020,999.
Iizuka, Tadashi, to Kabushiki Kaisha Hoya Lens; and Kabushiki Kaisha Sokkisha. Auto-refractometer. 4,021,102, Cl. 351-13.000.
Iizuka, Yo: *See—*
Murayama, Naohiro; Katto, Takayuki; Iizuka, Yo; and Sakagami, Teruo, 4,021,509.
Ijichi, Ichiro; Kai, Shigetoshi; Teranishi, Hikaru; Morioka, Akira; and Seki, Kazuyoshi, to Nitto Electric Industrial Co., Ltd. Pressure-sensitive adhesive composition. 4,021,391, Cl. 260-27.0BB.
Ikeda, Sadahiro: *See—*
Ueda, Hirotada; Uno, Takeshi; and Ikeda, Sadahiro, 4,021,778.
Illes, Charles P., Jr., to Flow Star Industries Inc. Volumetric feeder. 4,020,980, Cl. 222-411.000.
Illinois Railway Equipment Company: *See—*
Nadherny, Rudolph E., 4,021,067.
Illinois Tool Works Inc.: *See—*
Koscik, Richard A.; and Rapata, George M., 4,020,970.
Imagawa, Fumio: *See—*
Takeda, Yasutsugu; Tsunoda, Yoshito; Imagawa, Fumio; Kataoka, Keiji; and Tatsuno, Kimio, 4,021,606.
Imahori, Yutaka: *See—*
Kamegaya, Takeo; Kaneko, Ryuichi; Matsuzaki, Hideomi; and Imahori, Yutaka, 4,021,695.
Imamiya, Hitoshi: *See—*
Kiritani, Masataka; Matsukawa, Hiroharu; Watanabe, Akio; and Imamiya, Hitoshi, 4,021,595.
Imazaki, Kazushi: *See—*
Matsuda, Takayuki; Shimizu, Yoichi; Shimizu, Hiroki; Imazaki, Kazushi; and Nii, Setsuo, 4,021,205.
Imdieke, Thomas H.: *See—*
Moffat, Robert B.; Nystuen, David L.; and Imdieke, Thomas H., 4,020,865.
Impco Carburetion, Inc.: *See—*
Baverstock, Richard, 4,020,810.
Imperial Chemical Industries Limited: *See—*
Dyer, Peter; and Waterman, David Charles Alexander, 4,021,501.
Fielding, Harold Crosbie; Hutchinson, John; and Webster, Samuel John, 4,020,903.
Goulding, Terence; and Orton, Michael Leslie, 4,021,503.
Mallion, Keith Blakeney, 4,021,425.
Sproat, Alan Conrad, 4,021,001.
Incentive AB: *See—*
Svensson, Stig Lennart, 4,021,755.
Incom International Inc.: *See—*
Cantley, George A.; and Litzell, John E., 4,020,713.
Indesit Industria Elettrodomestici Italiana S.p.A.: *See—*
Campioni, Armando, 4,021,842.
Industrial Research & Engineering, Inc.: *See—*
Coats, John N., 4,020,726.
Inforex, Inc.: *See—*
Tech, Donald D., 4,021,776.
Inoue, Akira: *See—*
Tomono, Makoto; Yamakawa, Goiti; Inoue, Akira; and Otsuka, Masahiro, 4,021,358.
Inoue, Hitoshi: *See—*
Hyodo, Masakatsu; and Inoue, Hitoshi, 4,020,790.
Inoue, Kenjiro. Barbell with removable weights and a spring type gripping device. 4,021,040, Cl. 272-123.000.
Inoue, Yoshio: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.
Insetta, Victor; and Seaman, Harry V., to American Technical Ceramics, Division of Phase Industries, Inc. Verticle adjustable capacitor assembly. 4,021,708, Cl. 361-295.000.
Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Pertolieres Elf: *See—*
Durand, Jean-Pierre; Aubin, Bernard; Dawans, Francois; and Chapelet, Gilbert, 4,021,207.
Institute of Gas Technology: *See—*
Gillis, Jay C.; and Holcombe, Norman, 4,021,183.
Instituto Mexicano de Investicaciones Tecnologicas, A.C.: *See—*
Morales Guerrero, Josefina C.; and Lomelin Gallardo, Juan Manuel, 4,021,262.
Inter Innovation A.B.: *See—*
Lundblad, Leif, 4,020,972.
Intermountain Research and Development Corporation: *See—*
Baadsgaard, Marinus J., 4,021,527.
International Business Machines Corporation: *See—*
Erickson, John Joseph; Leland, Harold Lester; and Mathisen, Einar Skau, 4,021,711.
Furman, Anatol; Kalter, Howard Leo; and Nagel, Johann Werner, 4,021,789.
Gardner, Peter Lycett, 4,021,779.
Healey, Robert Albert; and Jeremiah, Thomas Leo, 4,021,655.
Hood, Roderick Kermit; and Raacke, Karl Heinz, 4,021,278.
Warwick, William Arthur, 4,021,838.
International Flavors & Fragrances Inc.: *See—*
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, 4,021,488.
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, 4,021,494.
International Nickel Company, Inc., The: *See—*
Kane, Robert Harvey, 4,021,373.
International Paint Company Limited, The: *See—*
Milne, Alexander; and Hails, George, 4,021,392.
International Shoe Machine Corporation: *See—*
Bergeron, Normand, 4,020,660.
International Standard Electric Corporation: *See—*
Kaiser, Hans; and Konnerth, Ernst, 4,021,177.
Wurst, Walter Kenneth, 4,021,618.
International Telephone and Telegraph Corporation: *See—*
Anhalt, John William; and Curley, James Harvey, 4,021,091.
Asam, Adolf R.; and Balkwill, John T., 4,021,216.
Eakins, Russell W.; and Hagan, Robert August, 4,020,721.
Levine, Arnold M., 4,021,661.
McCartney, Ronald L.; Hogan, Vaughn C.; Landgreen, Eleanor A.; and Bauerkemper, Michael I., 4,021,098.
Sapir, Said, 4,021,080.
Shihabi, Marwan S., 4,020,861.
Wycheck, Thomas Joseph, 4,021,621.
Interx Research Corporation: *See—*
Bodor, Nicolae S., 4,021,546.
Iowa State University Research Foundation, Inc.: *See—*
Chowdhury, Mofazzal Hossain, 4,020,682.
Iruretagoyena, Antonio. Cartridge construction. 4,020,763, Cl. 102-44.000.
Irvine, Robert; and Luperti, Harry E., to Pitney-Bowes, Inc. Envelope inserter and feeder system. 4,020,615, Cl. 53-35.000.
Iseda, Yoshihisa: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.
Ishidoshiro, Hiroshi: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,020,657.
Ishigaki, Yoshio; Hongu, Masayuki; and Okada, Takashi, to Sony Corporation. Signal amplifying circuit. 4,021,749, Cl. 330-22.000.
Ishihara, Tomoo; Sakai, Toshimitsu; and Yamada, Yasufumi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Control system for automatic transmission for electric automobiles. 4,021,712, Cl. 318-432.000.

Ishii, Kenjiro: *See—*
Ozaki, Yoshihiro; Saijo, Takao; Ishii, Kenjiro; Omata, Yasukuni; and Kondo, Shoji, 4,021,108.

Ishikawa, Katsuji: *See—*
Iwata, Hiroshi; and Ishikawa, Katsuji, 4,021,826.

Ishikawa, Yoshikazu, to Nissan Motor Co., Ltd. Rotary piston internal combustion engine with a stratified charge intake port system. 4,020,799, Cl. 123-8.130.

Ishikawa, Yoshikazu, to Nissan Motor co., Ltd. Rotary piston internal combustion engine with a stratified charge intake port system. 4,020,800, Cl. 123-8.130.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Nanjyo, Toshio; and Aoshika, Masayuki, 4,021,603.
Shinoda, Kazuo, 4,021,162.

Itabashi, Akio: *See—*
Komatsu, Koei; Harada, Kunihiro; Aotani, Seiji; and Itabashi, Akio, 4,021,259.

Ito, Isami, to Chinon Industries Incorporation. Film-feeding speed controlling device for sound-cinecamera. 4,021,104, Cl. 352-14.000.

ITP Corporation: *See—*
Breitzman, James J., 4,021,174.

ITT Industries, Inc.: *See—*
Muller, Ewald; and Becht, Reimund, 4,020,749.
Taxil, Andre Marc Victorin; Divoux, Jacques Clement; and Demaeyer, Joseph Henri, 4,021,696.

Iura, Yukio; Yamamichi, Masayoshi; Uchiyama, Takashi; Taguchi, Tetsuya; and Mashimo, Yukio, to Canon Kabushiki Kaisha. Film counter. 4,021,828, Cl. 354-217.000.

Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Company, Ltd. Camera control device. 4,021,826, Cl. 354-209.000.

Iwata, Toshiharu: *See—*
Hattori, Tadashi; Iwata, Toshiharu; and Nakase, Takamichi, 4,020,813.

IWK Pressen GmbH: *See—*
Oberheim, Heinz; and Katzer, Johann, 4,020,671.

Izumi, Hisashi, to Nissan Motor Co., Ltd. Vehicle steam engine using on-off valves for controlling steam temperature and pressure. 4,020,637, Cl. 60-665.000.

J. Ray McDermott & Co., Inc.: *See—*
Brown, Robert W.; and deBoer, Nico, 4,020,777.

Jachyra, George A.: *See—*
Lopiccolo, Mario T.; Schaffer, Max A.; and Jachyra, George A., 4,020,700.

Jackson, Egbert H., Jr.: *See—*
Black, Lawrence M.; Jackson, Egbert H., Jr.; and Bilow, Henry J., 4,021,813.

Jackson, James Albert: *See—*
Slatter, John Reginald; Jackson, James Albert; Brooks, John Gedny; Ward, Albert John Clark; and Dewhurst, Alan, 4,020,926.

Jackson, Richard R. Cuff inflation for tracheal tubes. 4,020,849, Cl. 128-351.000.

Jadot, Pierre Gaston Benoit. Plastic bags. 4,020,884, Cl. 150-3.000.

Jahnke, Richard William: *See—*
Habiby, Emile Najib; and Jahnke, Richard William, 4,021,333.

Jaki, Ivan, to Telefonaktiebolaget L M Ericsson. Quartz crystal compensation circuit. 4,021,762, Cl. 333-72.000.

Jakob, Fritz: *See—*
Streich, Martin; and Jakob, Fritz, 4,021,210.

Jalfre, Maurice: *See—*
Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, 4,021,567.

James, Emrys Craig; and Fairfax, Gerald Henry, to RCA Corporation. Apparatus for conserving energy in a building. 4,021,615, Cl. 179-2.00A.

Janata, Jiri A.: *See—*
Johnson, Curtis C.; Moss, Stanley D.; and Janata, Jiri A., 4,020,830.

Jander, Berthold R. Gas sampling probe. 4,020,697, Cl. 73-421.50R.

Jansa, Milos: *See—*
Spisiak, Juraj; Jansa, Milos; Bezdek, Miloslav; and Ferdus, Stanislav, 4,020,877.

Janssen, Jerry F.: *See—*
Barczynski, J. Robert; Deffenbaugh, Milton L.; Hedrick, Melvin R.; and Janssen, Jerry F., 4,021,819.

Japan Synthetic Rubber Co., Ltd.: *See—*
Komatsu, Koei; Harada, Kunihiro; Aotani, Seiji; and Itabashi, Akio, 4,021,259.

Jarnuszkiewicz, Stanislaw, to Politechnika Karkowska. Two-stroke, multicylinder, spark ignition, pumpless injection internal combustion engine. 4,020,801, Cl. 123-32.0SP.

Jeanmart, Claude: *See—*
Cotrel, Claude; Jeanmart, Claude; and Barreau, Michel, 4,021,554.

Jeppesen, Erling F., to Oce-van der Grinten N.V. Reproduction camera. 4,021,115, Cl. 355-56.000.

Jeppsen, Harvey I. Building material and method for making same. 4,021,401, Cl. 260-37.00N.

Jeremiah, Thomas Leo: *See—*
Healey, Robert Albert; and Jeremiah, Thomas Leo, 4,021,655.

Jilek, Rudolf: *See—*
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, 4,021,368.

Jirkovsky, Ivo L.: *See—*
Dobson, Thomas A.; Humber, Leslie G.; Demerson, Christopher A.; and Jirkovsky, Ivo L., 4,021,451.

Johansson, Erik Karl Gustav, to Aktiebolaget Electrolux. Vacuum cleaner nozzle with a movable brush. 4,020,526, Cl. 15-364.000.

John Wyeth & Brother Limited: *See—*
Weston, George Oliver, 4,021,469.
White, Alan Chapman; and Franklin, Richard Arthur, 4,021,550.

Johns Hopkins University, The: *See—*
Rabenhorst, David W., 4,020,714.

Johns, Robert W. Excavators. 4,021,075, Cl. 299-30.000.

Johnson, Curtis C.; Moss, Stanley D.; and Janata, Jiri A., to University of Utah, The. Selective chemical sensitive FET transducers. 4,020,830, Cl. 128-2.00E.

Johnson, Derwyn C.: *See—*
Kawasaki, Brian S.; and Johnson, Derwyn C., 4,021,099.

Johnson & Johnson: *See—*
Kalwaites, Frank, 4,021,284.
Rosenblum, Marc, 4,021,263.

Johnson, Neville Robert, to Bus Bodies (S.A.) Limited. Controlling rotary me:hanisms. 4,020,717, Cl. 74-804.000.

Johnsson, Mans Klas Olof; and Eriksson, Lars Anders, to Uddeholms Aktiebolag. Metallurgical process. 4,021,233, Cl. 75-60.000.

Joice, Richard L. Automatic hot needle attachment for bag wicketer. 4,021,291, Cl. 156-513.000.

Jomen, Katsumasa: *See—*
Iijima, Katsuhiko; and Jomen, Katsumasa, 4,020,745.

Jones, Andrew R., to Westinghouse Electric Corporation. Conversion of coal into hydrocarbons. 4,021,298, Cl. 176-39.000.

Jones, Charles Elmer, Jr.; and MacPherson, William Frederick, to Bell Telephone Laboratories, Incorporated. Telephone ringer isolator. 4,021,617, Cl. 179-17.00E.

Jones, Charlie Luther; and Schulte, William Lester, Jr., to RCA Corporation. Multifrequency signal receiver with digital tone receiver. 4,021,620, Cl. 179-84.0VF.

Jones, Donald H.; Burig, Robert G.; and McNally, Paul F., to Contraves-Goerz Corporation. Servo system employing a tracking digital angle encoder. 4,021,714, Cl. 318-594.000.

Jones, Henry W.: *See—*
Conrotto, Paul A.; and Jones, Henry W., 4,020,924.

Jones, John L.: *See—*
Gilman, William S.; Jones, John L.; and Rubino, Andrew M., 4,021,398.

Jones & Laughlin Steel Corporation: *See—*
Roney, John E., 4,020,695.

Jordan, John Francis, to Photon Power, Inc. Selective corona charger. 4,020,792, Cl. 118-629.000.

Jordan, Terence B.: *See—*
Morduchowitz, Abraham; Jordan, Terence B.; and Rubin, Isaac D., 4,021,357.

Joseph, Joseph Peter: *See—*
Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, 4,021,544.
Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, 4,021,545.

Joynes, Brian; and Bainbridge, Wilfred Nicholas, to Automotive Products Company Limited. Power plants. 4,020,635, Cl. 60-525.000.

Juilfs, Donald R.: *See—*
Fort, J. Robert; Westphal, James A.; and Juilfs, Donald R., 4,021,649.

Junker, Ralph D. Firearms. 4,020,741, Cl. 89-185.000.

Kabakov, Mikhail Grigorievich: *See—*
Gorchakov, Mikhail Fedorovich; Kabakov, Mikhail Grigorievich; Kashtanov, Leonid Nikolaevich; Morozov, Viktor Prokofievich; Chuprakov, Jury Ivanovich; and Scherbakov, Vitaly Fedorovich, 4,021,154.

Kabel-und Metallwerke Gutenhoffnungshutte Aktiengesellschaft: *See—*
Ahrens, Gunter; Hesse, Hans Hermann; Beierfuss, Gunter; and Wagner, Erich, 4,020,531.

Kabushiki Kaisha Daini Seikosha: *See—*
Kuwabara, Tsuneo; Yokoyama, Kouzo; and Kobori, Takenobu, 4,020,626.

Kabushiki Kaisha Hoya Lens: *See—*
Iizuka, Tadashi, 4,021,102.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Kitagawa, Kunio, 4,020,900.
Takada, Hiroshi, 4,020,641.

Kabushiki Kaisha Shikutani: *See—*
Mizuno, Hitoshi; and Akiyama, Satoshi, 4,020,552.

Kabushiki Kaisha Sokkisha: *See—*
Iizuka, Tadashi, 4,021,102.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Chiku, Takewo; Ninomiya, Kiyoshi; Yoshida, Takashi; Kogiso, Takeshi; Hayashi, Hiroaki; and Matsui, Noboru, 4,021,255.

Kaelin, Joseph Richard. Apparatus for circulating and/or aerating a liquid. 4,021,349, Cl. 210-219.000.

Kai, Shigetoshi: *See—*
Ijichi, Ichiro; Kai, Shigetoshi; Teranishi, Hikaru; Morioka, Akira; and Seki, Kazuyoshi, 4,021,391.

Kaiser Aluminum & Chemical Corporation: *See—*
Amos, Alvin C., 4,020,611.
Roberts, Sidney G., 4,021,271.

Kaiser, Hans; and Konnerth, Ernst, to International Standard Electric Corporation. Apparatus for forming raised marks on plastic cable jackets. 4,021,177, Cl. 425-324.00R.

Kakegawa, Yasuo: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.

Kakizaki, Fusayoshi: *See—*
Takemoto, Tadashi; Kakizaki, Fusayoshi; Ariyoshi, Yasuo; and Noda, Ichiro, 4,021,418.

Kalen, Hans: *See—*
Glanvall, Rune; Kalen, Hans; and Pettersson, Kurt, 4,021,166.

Kaliszewski, Edmond S.: *See—*
Krueger, David F.; and Kaliszewski, Edmond S., 4,021,519.

Kalter, Howard Leo: *See—*
Furman, Anatol; Kalter, Howard Leo; and Nagel, Johann Werner, 4,021,789.

Kalwaites, Frank, to Johnson & Johnson. Nonwoven fabric and method and apparatus for producing the same. 4,021,284, Cl. 156-277.000.

Kamegaya, Takeo; Kaneko, Ryuichi; Matsuzaki, Hideomi; and Imahori, Yutaka, to Nippon Hoso Kyokai. Gaseous discharge display panel of multi-layer construction. 4,021,695, Cl. 313-188.000.

Kamei, Isao: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,020,657.

Kamogawa, Nin-ichi; and Uchida, Tohru, to Konishiroku Photo Industry Co., Ltd. Method and device for charging an electrophotographic photosensitive material. 4,021,709, Cl. 361-229.000.

Kanall, Leone. Male external urinary catheter. 4,020,843, Cl. 128-295.000.

Kane, Robert Harvey, to International Nickel Company, Inc., The. Method of preparing a catalytic structure. 4,021,373, Cl. 252-470.000.

Kaneko, Ryuichi: *See—*
Kamegaya, Takeo; Kaneko, Ryuichi; Matsuzaki, Hideomi; and Imahori, Yutaka, 4,021,695.

Kanno, Kyusei, to Asahi Kogaku Kogyo Kabushiki Kaisha. Information indicating device in a camera viewfinder. 4,021,830, Cl. 354-225.000.

Kanno, Yoshihiro: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.

Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, to Synthelabo. 2-Methoxy-benzamide derivatives. 4,021,567, Cl. 424-274.000.

Kaplan, Samuel: *See—*
Marshall, John; and Kaplan, Samuel, 4,021,300.

Karavai, Vladimir Alexandrovich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.

Karlsson, Kurt; and Lundberg, Thorsten, to AB Gotaverken. Device for attaching a scaffolding bracket to a vertical wall surface. 4,021,011, Cl. 248-235.000.

Karn, Helmut: *See—*
Frank, Anton; Karn, Helmut; and Dockner, Toni, 4,021,442.

Karn, Jack Lee, to Lubrizol Corporation, The. Basic metal salts of sulfur- and methylene-bridged poly-phenol compositions, and epoxide-reacted derivatives thereof, and lubricants containing them. 4,021,419, Cl. 260-128.000.

Karoll, Paul. Apparatus for manipulating a multiple panel screen. 4,020,889, Cl. 160-120.000.

Kasamura, Toshiro: *See—*
Tanaka, Hidetoshi; Sato, Tadashi; and Kasamura, Toshiro, 4,021,109.

Kashitani, Tsuneo: *See—*
Hino, Masamichi; Fukui, Kou; Kashitani, Tsuneo; Enomoto, Kazuyoshi; and Hijikata, Setsuo, 4,020,912.

Kashtanov, Leonid Nikolaevich: *See—*
Gorchakov, Mikhail Fedorovich; Kabakov, Mikhail Grigorievich; Kashtanov, Leonid Nikolaevich; Morozov, Viktor Prokofievich; Chuprakov, Jury Ivanovich; and Scherbakov, Vitaly Fedorovich, 4,021,154.

Kast, Howard B.: *See—*
Coffinberry, George A.; and Kast, Howard B., 4,020,632.

Katagiri, Yoshio; and Suda, Ryuichi, to Nippon Electric Company, Ltd. Non-linear coder for pulse code modulation of telephone signals or the like. 4,021,800, Cl. 340-347.0AD.

Kataoka, Keiji: *See—*
Takeda, Yasutsugu; Tsunoda, Yoshito; Imagawa, Fumio; Kataoka, Keiji; and Tatsuno, Kimio, 4,021,606.

Kataoka, Shoei; Komamiya, Yasuo; Kawashima, Mitsuo; Hashizume, Nobuo; and Tomizawa, Kazutaka, to Agency of Industrial Science & Technology. Semiconductor device. 4,021,680, Cl. 307-216.000.

Kataoka, Youichi: *See—*
Naruishi, Tadayuki; Kataoka, Youichi; Sasabe, Haruyoshi; and Tutiya, Satoru, 4,021,598.

Kato, Makoto: *See—*
Cuneo, Edward A.; Kato, Makoto; and Wilson, Michael S., 4,020,535.

Kato, Takeshi: *See—*
Hayashi, Jun; Kato, Takeshi; and Arai, Atsuaki, 4,021,238.

Kato, Toshikazu: *See—*
Motoyama, Kazuyasu; and Kato, Toshikazu, 4,021,856.

Katto, Takayuki: *See—*
Murayama, Naohiro; Katto, Takayuki; Iizuka, Yo; and Sakagami, Teruo, 4,021,509.

Katz, Lawrence E.: *See—*
Ardis, Alan E.; and Katz, Lawrence E., 4,021,261.

Katzer, Johann: *See—*
Oberheim, Heinz; and Katzer, Johann, 4,020,671.

Katzer, Josef: *See—*
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, 4,021,368.

Kauffman, Eric R.: *See—*
Suyderhoud, Henri G.; Onufry, Michael, Jr.; and Kauffman, Eric R., 4,021,623.

Kauffman, Harry Dean: *See—*
Losey, Jerry Earl; Witzel, John Richard; and Kauffman, Harry Dean, 4,021,635.

Kaufman, Warren F., to Ford Aerospace & Communications. Fuel distributor apparatus for plug-type carburetor. 4,021,511, Cl. 261-44.00A.

Kaufman, Warren F., to Aeronutronic Ford Corporation. Carburetor air turbine fuel distributor. 4,021,512, Cl. 261-44.00A.

Kautz, Glenn E., to H. H. Robertson Company. Light transmitting building panel. 4,020,989, Cl. 237-1.00A.

Kautzmann, Karl H.: *See—*
Heller, Martin G.; Cheney, Richard L.; and Kautzmann, Karl H., 4,020,880.

Kawai, Ryutaro: *See—*
Murakami, Masuo; Takahashi, Kozo; Ozasa, Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, 4,021,434.

Kawai, Takashi: *See—*
Makino, Michio; Kawai, Takashi; Takahashi, Ryoji; Kubo, Yoshimi; and Obata, Fumio, 4,021,232.

Kawamoto, Katsuaki: *See—*
Furuishi, Haruhisa; Kawamoto, Katsuaki; and Koyama, Yoneji, 4,021,717.

Kawasaki, Brian S.; and Johnson, Derwyn C., to Canadian Patents and Development Limited. Optical couplers for fiber optic communication links. 4,021,099, Cl. 350-96.00C.

Kawasaki, Hideo: *See—*
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Shozo, 4,021,196.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Mitsuhashi, Kanzi; Matsushima, Kanji; and Miki, Osamu, 4,021,651.

Kawasaki, Noboru: *See—*
Toyomoto, Yoshitaka; and Kawasaki, Noboru, 4,021,051.

Kawashima, Hirokuni; and Suzuki, Kiyoshi, to Canon Kabushiki Kaisha. Process for producing cadmium sulfide for electrophotography. 4,021,237, Cl. 96-1.500.

Kawashima, Mitsuo: *See—*
Kataoka, Shoei; Komamiya, Yasuo; Kawashima, Mitsuo; Hashizume, Nobuo; and Tomizawa, Kazutaka, 4,021,680.

Kayama, Naohiro: *See—*
Fujii, Setsuro; Uegai, Yoshiaki; Watanabe, Tsuyoshi; and Kayama, Naohiro, 4,021,472.

Kecskes, Lajos: *See—*
Pungor, Erno; Doktor, Elek; Patko, Marton; Havas, Jeno; and Kecskes, Lajos, 4,021,325.

Keenan, Bernard J., to Sun Oil Company of Pennsylvania. Acoustical pick-up for reception of signals from a drill pipe. 4,021,773, Cl. 340-18.0LD.

Keir, Donald James. Cargo tie-down gripping anchor assembly. 4,020,769, Cl. 105-481.000.

Keller, Wolfgang: *See—*
Reuschel, Konrad; Keller, Wolfgang; Kersting, Arno; and Emeis, Reimer, 4,020,791.

Kelly, Fred. Pick for stringed instruments. 4,020,732, Cl. 84-322.000.

Kelly, Patrick M.; and Dorazio, Alton, to Stromberg-Carlson Corporation. Automatic call generator. 4,021,624, Cl. 179-175.20D.

Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, to Research Corporation. Intermediates for polycyclic quinonoid antibiotics. 4,021,457, Cl. 260-383.000.

Kennedy, Clive. Audio information modifying apparatus. 4,021,613, Cl. 179-1.00D.

Kennedy, Francis Millard, to Simplimatic Engineering Co. Article inverter. 4,020,941, Cl. 198-402.000.

Kermisch, Dorian: *See—*
Sheridon, Nicholas K.; and Kermisch, Dorian, 4,021,236.

Kern, Richard A.; McClung, Carl L.; and Turner, James R., to Caterpillar Tractor Co. Exhaust gas recirculation system for a diesel engine. 4,020,809, Cl. 123-119.00A.

Kerr, John L.; and Timochko, Michael J., to United States of America, Army. Broadband corrugated horn with double-ridged circular waveguide. 4,021,814, Cl. 343-786.000.

Kersting, Arno: *See—*
Reuschel, Konrad; Keller, Wolfgang; Kersting, Arno; and Emeis, Reimer, 4,020,791.

Kettleson, Russell W. Compact golf club assembly. 4,021,038, Cl. 273-80.100.

Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butu-

zov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna. Process for producing amethyst crystals. 4,021,294, Cl. 156-623.00Q.

Khlestkin, Mikhail Petrovich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.

Khusnoyarov, Karl Borisovich, deceased: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.

Kienzle Apparate GmbH: *See—*
Saufferer, Manfred; Spauszus, Siegfried; and Warkentin, Ulrich, 4,021,645.

Kikuchi, Isamu: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.

Kilby, Jack S.; Lathrop, Jay W.; and Porter, Wilbur A., to Texas Instruments Incorporated, a part interest. Solar energy conversion. 4,021,323, Cl. 204-129.000.

Kimball International, Inc.: *See—*
Robinson, John William; and Doane, Patrick King, 4,020,728.

Kimblin, Clive W., to Westinghouse Electric Corporation. Vacuum fault current limiter. 4,021,628, Cl. 200-144.00B.

Kimbrell, Sol B.: *See—*
Heilmayr, Peter F.; and Kimbrell, Sol B., 4,021,169.

Kimlinger, Joseph Anthony, to Sperry Rand Corporation. Clock synchronization system. 4,021,784, Cl. 340-172.500.

Kimmel, Donald S.: *See—*
Gary, Wardell; Taylor, Glenn R.; and Kimmel, Donald S., 4,021,703.

Kimmon Manufacturing Co., Ltd.: *See—*
Onoda, Hajime; and Watanabe, Hiroshi, 4,020,689.

Kimura, Isao: *See—*
Koyama, Hiroaki; and Kimura, Isao, 4,021,410.

Kimura, Satoshi: *See—*
Yoshida, Masateru; Iinuma, Yoshio; Yasuda, Tetuya; and Kimura, Satoshi, 4,020,627.

King, Earl R.: *See—*
McCoy, Frank L.; and King, Earl R., 4,020,894.

King, Frank T.: *See—*
Budrick, Ronald G.; King, Frank T.; Nolen, Robert L., Jr.; and Solomon, David E., 4,021,253.

King, J. Frank; Lathery, Willie M.; and Beamon, Howard L., to Hanes Corporation. Toe closing machine and method for panty hose. 4,020,775, Cl. 112-121.150.

Kinkaid, Robert John; and Asick, John Carl, to AMP Incorporated. Stacked carrier strip assembly. 4,021,095, Cl. 339-276.0SF.

Kipp, Michael A., to Container Corporation of America. Carton with contoured, recessed bottom wall. 4,020,988, Cl. 229-16.00A.

Kirby, Paul J.; and Gardner, Edward M., to United States of America, Air Force. Interface system for a computer terminal and random access slide projector. 4,021,785, Cl. 340-172.500.

Kiritani, Masataka; Matsukawa, Hiroharu; Watanabe, Akio; and Imamiya, Hitoshi, to Fuji Photo Film Co., Ltd. Pressure sensitive recording sheet. 4,021,595, Cl. 428-307.000.

Kirkland, James L., to United States of America, Navy. Mobile mine detection system having plural color display. 4,021,725, Cl. 324-3.000.

Kirkpatrick, Harold B.; Distler, Edward C.; and Menzin, Marvin, to Reichhold Chemicals, Inc. Package and method for preparing orthopedic cast-making materials. 4,020,832, Cl. 128-90.000.

Kirkvold, Charles F.: *See—*
Pisio, Peter; and Kirkvold, Charles F., 4,020,901.

Kisfaludy, Lajos; Rohricht, Julianna; Urogdi, Laszlo; Szeberenyi, Szabolcs; Palosi, Eva; and Szporny, Laszlo, to Richter Gedeon Vegyeszeti Gyar Rt. Benzodiazepine derivatives. 4,021,421, Cl. 260-239.30D.

Kish, Istvan T. Process for truing grinding wheels. 4,020,820, Cl. 125-11.00R.

Kishi, Kazuo; and Naganuma, Kazuo, to Daicel, Ltd. Gas-generating agent for air bag. 4,021,275, Cl. 149-35.000.

Kitagawa, Kunio, to Kabushiki Kaisha Komatsu Seisakusho. Device for ventilating cooling air of construction. 4,020,900, Cl. 165-135.000.

Kitt, Daniel G., to Skagit Corporation. Chain/wire rope connector assembly for anchor. 4,020,779, Cl. 114-293.000.

Kitterman, Lawrence Pete; and Rice, Howard Gene. Tray washing system. 4,021,266, Cl. 134-63.000.

Kjellberg, Bengt Erik Sigvard: *See—*
Hernestam, Sven Erik Harry; Bjork, Anders Karl Konrad; Abramo, Aina Lisbeth; and Kjellberg, Bengt Erik Sigvard, 4,021,564.

Klages, Robert; and Kleeschulte, Heinrich, to Hoesch Aktiengesellschaft. Method for continuous casting of steel. 4,020,892, Cl. 164-89.000.

Klancnik, John H., to Afco Products Incorporated. Antenna couplings. 4,021,809, Cl. 343-715.000.

Klapp, Steven Michael, to Parke, Davis & Company. Medicament-dispensing package. 4,020,839, Cl. 128-272.000.

Klasel, Dan E. Filter catcher. 4,020,922, Cl. 184-1.500.

Klaus, Michael Josef: *See—*
Fischli, Albert Eduard; Klaus, Michael Josef; Mayer, Hans Johann; and Wick, Alexander Eduard, 4,021,446.

Kleeschulte, Heinrich: *See—*
Klages, Robert; and Kleeschulte, Heinrich, 4,020,892.

Kleist, Herbert H.: *See—*
Castro, Raoul; Kleist, Herbert H.; and Meredith, Louis O., 4,020,787.

Klemm, Kurt: *See—*
Schmidt, Richard; and Klemm, Kurt, 4,021,542.

Klette, Guenter, to Astor-Werk Otto Berning & Co., Firma. Unfastening button, particularly for upholstery. 4,020,529, Cl. 24-90.0TB.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Wehren, Peter, 4,021,337.

KMS Fusion, Inc.: *See—*
Budrick, Ronald G.; King, Frank T.; Nolen, Robert L., Jr.; and Solomon, David E., 4,021,253.

Knapp, Lester L.; and Miller, Gene S., to Aluminum Company of America. Method of operating an electrolytic cell. 4,021,317, Cl. 204-67.000.

Knorre, Helmut; and Fischer, Joachim, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Method of dissolving a silver coating in a photo tank. 4,021,264, Cl. 134-3.000.

Knowles, Lloyd C. Land ski apparatus. 4,021,052, Cl. 280-11.200.

Kobayashi, Shoichi: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; Yokoyama, Toshiro; and Kobayashi, Shoichi, 4,021,510.

Kobayashi, Yukitsugu: *See—*
Koizumi, Mokuji; and Kobayashi, Yukitsugu, 4,020,664.
Koizumi, Mokuji; and Kobayashi, Yukitsugu, 4,020,665.

Kobayasi, Makoto; and Hiramoto, Minoru, to Matsuyama Plow Mfg. Co., Ltd. Reversible plow. 4,020,908, Cl. 172-742.000.

Kobori, Takenobu: *See—*
Kuwabara, Tsuneo; Yokoyama, Kouzo; and Kobori, Takenobu, 4,020,626.

Kochhar, Rajindar K.; and Rowatt, Robert J., to Gulf Research & Development Company. Olefin polymerization process and catalyst. 4,021,599, Cl. 526-124.000.

Kodama, Hiroshi: *See—*
Morita, Yasuyuki; and Kodama, Hiroshi, 4,021,163.

Kogan, Susan L.: *See—*
Lamberti, Vincent; and Kogan, Susan L., 4,021,376.

Kogiso, Takeshi: *See—*
Chiku, Takewo; Ninomiya, Kiyoshi; Yoshida, Takashi; Kogiso, Takeshi; Hayashi, Hiroaki; and Matsui, Noboru, 4,021,255.

Koizumi, Mokuji; and Kobayashi, Yukitsugu, to Mitsubishi Jukogyo Kabushiki Kaisha. Device for adjusting the phase of roll dies in a cross-rolling machine. 4,020,664, Cl. 72-108.000.

Koizumi, Mokuji; and Kobayashi, Yukitsugu, to Mitsubishi Jukogyo Kabushiki Kaisha. Device for holding raw material in a cross-rolling machine. 4,020,665, Cl. 72-108.000.

Kojima, Hiromitsu; and Yoshida, Kimio, to Mitsui Mining & Smelting Co., Ltd.; and Fuji Sangyo Co., Ltd. Transporting apparatus. 4,020,944, Cl. 198-473.000.

Kojima, Hiroomi; Zama, Hideo; Nomura, Sadao; Tabuchi, Toyoji; and Murata, Ryozo, to Hitachi, Ltd. Liquid crystal display panel and method for driving the same. 4,021,798, Cl. 340-324.00M.

Kojima, Yukio: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.

Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, to Bayer Aktiengesellschaft. Substituted phenylisothioureas and processes for their preparation and use. 4,021,571, Cl. 424-300.000.

Komamiya, Yasuo: *See—*
Kataoka, Shoei; Komamiya, Yasuo; Kawashima, Mitsuo; Hashizume, Nobuo; and Tomizawa, Kazutaka, 4,021,680.

Komatsu, Koei; Harada, Kunihiro; Aotani, Seiji; and Itabashi, Akio, to Japan Synthetic Rubber Co., Ltd. Gypsum Composition. 4,021,259, Cl. 106-111.000.

Komitovski, Mihail Dimitrov: *See—*
Slavinski, Ivan Assenov; Angelov, Todor Dimitrov; Vukolov, Dmitri Dmitrievich; Burgudjiev, Eduard Todorov; and Komitovski, Mihail Dimitrov, 4,020,545.

Kondo, Shoji: *See—*
Ozaki, Yoshihiro; Saijo, Takao; Ishii, Kenjiro; Omata, Yasukuni; and Kondo, Shoji, 4,021,108.

Konishiroku Photo Industry Co., Ltd.: *See—*
Kamogawa, Nin-ichi; and Uchida, Tohru, 4,021,709.
Morita, Shizuo, 4,021,107.
Tomono, Makoto; Yamakawa, Goiti; Inoue, Akira; and Otsuka, Masahiro, 4,021,358.

Konnerth, Ernst: *See—*
Kaiser, Hans; and Konnerth, Ernst, 4,021,177.

Konomi, Toshiaki; Nurita, Joji; and Tanazawa, Yasushi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Intake manifold flow equilizing means. 4,020,805, Cl. 123-52.00M.

Konrad, Charles Edward, to General Electric Company. Battery monitoring apparatus. 4,021,718, Cl. 320-48.000.

Koops, Hans, to Siemens Aktiengesellschaft. Charged-particle beam

optical apparatus for irradiating a specimen in a two-dimensional pattern. 4,021,674, Cl. 250-492.00A.

Kopeika, Saul Z. Balloon signal assembly. 4,020,786, Cl. 116-124.00B.

Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; Engelhardt, Albrecht; and Taunecker, Werner, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-(2'-ethynylphenoxy)-2-hydroxy-3-(cycloalkyl-amino)-propane and method of use. 4,021,576, Cl. 424-330.000.

Koppers Company, Inc.: *See*—
Williams, Charles H., 4,020,950.

Korn, Clarence D.: *See*—
Ferguson, Jack A.; and Korn, Clarence D., 4,021,192.

Korwin, Paul: *See*—
O'Sullivan, Thomas F.; and Korwin, Paul, 4,020,772.

Koscik, Richard A.; and Rapata, George M., to Illinois Tool Works Inc. Rotatable closure device. 4,020,970, Cl. 220-293.000.

Koslowski, Gunter, to Fried. Krupp Gessellschaft mit beschrankter Haftung. Membrane filter system. 4,021,350, Cl. 210-232.000.

Kouth, Herbert: *See*—
Salomon, Horst; and Kouth, Herbert, 4,020,593.

Koyama, Hiroaki; and Kimura, Isao, to Nippon Kynol Inc. Melt-spun drawn or undrawn flame-resistant and antifusing cured epoxy-modified novolak filaments and process for production thereof. 4,021,410, Cl. 260-59.0EP.

Koyama, Yoneji: *See*—
Furuishi, Haruhisa; Kawamoto, Katsuaki; and Koyama, Yoneji, 4,021,717.

Kozacka, Frederick J.; and Belcher, Richard A., to Gould Inc., Electric Fuse Division. Electric fuse with plate-supported fusible element. 4,021,765, Cl. 337-159.000.

Krakowskie Zaklady Farmaceuticzne "Polfa": *See*—
Eckstein, Marian; May, Jerzy; Herdegen, Eleonora; and Kulig, Daniel, 4,021,473.

Krehbiel, Vivian D.; and Cord, Carl E., to Kreonite, Inc. Photocell control device for a photographic film processor. 4,021,832, Cl. 354-298.000.

Krenmayr, Willy, to Emhart Zurich S.A. Glass container inspection machine. 4,021,122, Cl. 356-240.000.

Krenzer, John, to Velsicol Chemical Corporation. 1-(5-Trifluoromethyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-acetyloxy-1,3-imidazolidin-2-one. 4,021,439, Cl. 260-306.80D.

Kreonite, Inc.: *See*—
Krehbiel, Vivian D.; and Cord, Carl E., 4,021,832.

Krespan, Carl George; and Smart, Bruce Edmund, to Du Pont de Nemours, E. I., and Company. Reaction of sulfur trioxide with cyclic (4- and 5-membered ring) fluorovinylethers. 4,021,489, Cl. 260-586.00R.

Krey Packing Company: *See*—
Svoboda, Donald J.; and Schwerdt, Loretta E., 4,021,585.

Krobel, Heinz: *See*—
Zindikus, Walter; Krobel, Heinz; and Franke, Walter, 4,021,113.

Krude, Werner, to Lohr & Bromkamp GmbH. Constant velocity torque transmitting joint. 4,020,648, Cl. 64-21.000.

Krude, Werner, to Lohr & Bromkamp GmbH. Constant velocity universal joint and ball grooves therefor. 4,020,650, Cl. 64-21.000.

Krueger, David F.; and Kaliszewski, Edmond S., to Standard Oil Company (Indiana). Method for forming and keeping molten the recessed area of a fabricated plastic product. 4,021,519, Cl. 264-96.000.

Kruger, James Brompton; and Sonntag, Karl Frederick, to Scovill Manufacturing Company. Identification badge. 4,020,575, Cl. 40-1.500.

Kruzan, Albert W.; Boppart, Loren P.; and Bland, Charles M., to Chromalloy American Corporation. Cam hook for snugging doors. 4,021,064, Cl. 292-111.000.

Kubo, Yoshimi: *See*—
Makino, Michio; Kawai, Takashi; Takahashi, Ryoji; Kubo, Yoshimi; and Obata, Fumio, 4,021,232.

Kubota, Kunihiro: *See*—
Shimizu, Noboru; Yoshida, Sadao; Kubota, Kunihiro; and Ohara, Takashi, 4,021,310.

Kubota Ltd.: *See*—
Hino, Masamichi; Fukui, Kou; Kashitani, Tsuneo; Enomoto, Kazuyoshi; and Hijikata, Setsuo, 4,020,912.

Kudchadker, Mohan V.; Walker, Thad O.; and Schoen, William, to Texaco Inc. Alkoxylated asphalts as co-surfactants in surfactant oil recovery processes usable in formations containing water having high concentrations of polyvalent ions such as calcium and magnesium. 4,021,356, Cl. 252-8.55D.

Kudinov, Valentin Georgievich; and Genkin, Mikhail Dmitrievich. Pickup for measuring vibration parameters of operating machinery parts. 4,021,688, Cl. 310-8.700.

Kugelfischer Georg Schafer & Co.: *See*—
Gassner, Hans; and Lang, Otto, 4,020,710.

Kulig, Daniel: *See*—
Eckstein, Marian; May, Jerzy; Herdegen, Eleonora; and Kulig, Daniel, 4,021,473.

Kummer, Rudolf; Schwirten, Kurt; Schindler, Hans-Dieter, deceased; by Schindler, Maria Elisabeth; by Lang, Ute; and by Schindler, Rainer, heirs-at-law, to BASF Aktiengesellschaft. Regeneration and separation of rhodium-containing or iridium-containing catalysts from distillation residues following hydroformylation. 4,021,463, Cl. 260-429.00R.

Kummer, Werner: *See*—
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; Engelhardt, Albrecht; and Taunecker, Werner, 4,021,576.

Kummerer, Richard A.: *See*—
Wildman, Claude L.; and Hellmer, George A., 4,020,631.

Kumysh, Ilya Iosifovich: *See*—
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.

Kunimori, Kametaro: *See*—
Toda, Hiromi; Kunimori, Kametaro; and Tsumori, Kuniaki, 4,021,484.

Kunststoff-Spritzgusswerk: *See*—
Sarstedt, Walter, 4,021,124.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, 4,021,390.
Murayama, Naohiro; Katto, Takayuki; Iizuka, Yo; and Sakagami, Teruo, 4,021,509.

Kuriakose, Areekattuthazhayil K., to Norton Company. Non-catalytic synthesis of silicon oxynitride. 4,021,529, Cl. 423-325.000.

Kuroishi, Shoji; and Mochizuki, Manabu, to Ricoh Co., Ltd. Developing device in electrophotographic copying apparatus. 4,021,111, Cl. 355-10.000.

Kutter, Eberhard; Austel, Volkard; Eberlein, Wolfgang; and Heider, Joachim, to Boehringer Ingelheim GmbH. 1,3-Dioxo-2-[(methoxyphenethyl-amino)-alkyl]-4,4-dimethyl-isoquinolines and salts thereof useful as hypotensive agents. 4,021,558, Cl. 424-258.000.

Kuwabara, Kooji; Sugawara, Hiroyuki; and Miyashita, Takao, to Hitachi, Ltd. Persistent current switch including electrodes forming parallel conductive and superconductive paths. 4,021,633, Cl. 200-262.000.

Kuwabara, Tsuneo; Yokoyama, Kouzo; and Kobori, Takenobu, to Kabushiki Kaisha Daini Seikosha. Electronic timepiece. 4,020,626, Cl. 58-23.00R.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Fujimoto, Yasuo; Nakano, Kinichi; and Urakawa, Chikahiro, 4,021,449.

Kytola, Aimo J. Remote control apparatus for varying engine speeds and the like. 4,020,938, Cl. 192-142.00R.

La Soudure Electrique Autogene, Procedes Arcos: *See*—
DeHaeck, Robert J., 4,021,637.

Labavia-S.G.E.: *See*—
Sertori, Jean-Claude, 4,020,931.

Lacefield, William B.; and Ho, Peter P. K., to Eli Lilly and Company. 5,6-Diaryl-1,2,4-triazines as topically-active anti-inflammatory agents. 4,021,553, Cl. 424-249.000.

Lacoste, Jean-Pierre: *See*—
Legler, George; Hostettler, Hans; Lacoste, Jean-Pierre; and Schwab, Friedrich, 4,020,604.

Lacroix, Guy; and Debourge, Jean-Claude, to Philagro. Fungicidal compositions based on monoaminophosphites. 4,021,549, Cl. 424-220.000.

Ladas, Christopher Angelos: *See*—
Hunt, Merrill Roe; Ladas, Christopher Angelos; and Mastroianni, Sal Thomas, 4,021,270.

Lafontaine, George Stanford, to Hoffmann-La Roche Inc. Radioimmunoassay. 4,021,534, Cl. 424-1.000.

LaForce, Edward P., to Ventur-E, Inc. of Richmond. Recirculating fuel feed and vaporization apparatus and method. 4,020,811, Cl. 123-122.0AC.

La Haye, Paul G., to Aqua-Chem, Inc. Reduction of pollutants in gaseous hydrocarbon combustion products. 4,021,191, Cl. 431-353.000.

Lamantia, Charles R.: *See*—
Field, Edwin L.; Lamantia, Charles R.; Lunt, Richard R.; Oberholtzer, James E.; and Valentine, James R., 4,021,202.

Lamb, W. C.: *See*—
Hauldren, H. Morris, 4,020,688.

Lambert, Roy E.: *See*—
McKeon, John F.; and Lambert, Roy E., 4,020,712.

Lamberti, Vincent; and Kogan, Susan L., to Lever Brothers Company. Detergent compositions with nonphosphate builders containing two or more carboxyl groups. 4,021,376, Cl. 252-542.000.

Landgreen, Eleanor A.: *See*—
McCartney, Ronald L.; Hogan, Vaughn C.; Landgreen, Eleanor A.; and Bauerkemper, Michael I., 4,021,098.

Lang, Armin, to Zahnradfabrik Friedrichshafen AG. Valve structure for hydraulic control system. 4,020,748, Cl. 91-449.000.

Lang, Otto: *See*—
Gassner, Hans; and Lang, Otto, 4,020,710.

Lang, Ute: *See*—
Kummer, Rudolf; Schwirten, Kurt; Schindler, Hans-Dieter, deceased; Schindler, Maria Elisabeth; Lang, Ute; and Schindler, Rainer, heirs-at-law, 4,021,463.

Lange, Kurt; and Treser, Gerhard, to New York Medical College. Antigen isolated from group A (beta-hemolytic) streptococci and method for isolating the same. 4,021,541, Cl. 424-92.000.

Langer, Alfred C.: *See*—
Reynolds, Frank L.; and Langer, Alfred C., 4,020,613.

Langerock, Luc Felix Marie-Louis Ghislain, to Hamon-Sobelco S.A. Atmospheric cooling tower with dry-type heat exchangers. 4,020,899, Cl. 165-110.000.

Larson, David G.: *See*—
Bakken, Kenneth W.; and Larson, David G., 4,021,131.

Larson, Roger R., to Pharmaco, Inc. (Entire). Hollow piercing tip for vial stoppers. 4,020,837, Cl. 128-218.00N.

LaSalle Machine Tool, Inc.: *See—*
Schroeder, Michael J., 4,020,955.

Lathery, Willie M.: *See—*
King, J. Frank; Lathery, Willie M.; and Beamon, Howard L., 4,020,775.

Lathrop, Jay W.: *See—*
Kilby, Jack S.; Lathrop, Jay W.; and Porter, Wilbur A., 4,021,323.

LaTourette, Eugene E. Portable punch. 4,020,554, Cl. 30-358.000.

Lattion, Andre, to Rieter Machine Works, Ltd. Method and apparatus for a joint start-up and stopping of the spinning positions of an open-end spinning machine. 4,020,622, Cl. 57-34.00R.

Laue, Gunter. Method and system for testing of individual gear teeth. 4,020,678, Cl. 73-67.200.

Lawrence Peska Associates, Inc.: *See—*
Robison, Wayne B., 4,020,519.

Lawson, John E.; and Dennis, Ronald D., to Mead Johnson & Company. 4-Tertiary-amino-2,6-diaminopyridine 1-oxides. 4,021,562, Cl. 424-267.000.

Layne, Gilbert S.; and Huml, James O., to Dow Chemical Company, The. Preparation of metal fluorides. 4,021,530, Cl. 423-489.000.

Le Nickel: *See—*
Gandon, Louis; and Cheneau, Gilbert, 4,021,532.

Lear Siegler, Inc.: *See—*
Houskamp, Robert W.; and DeBruine, Carl, 4,020,918.
Stephan, Karl Heinz, 4,020,752.

Leaton, Eric John: *See—*
Goodall, Laurence; and Leaton, Eric John, 4,021,685.

Lebow Associates, Inc.: *See—*
Brendel, Albert E., 4,020,686.

Le Coquil, Emile F.; Amicel, Jean C.; and Martiniere, Jean-Pierre G. Writing head for facsimile image reproduction. 4,021,851, Cl. 358-302.000.

Lederer, Johann: *See—*
Mortl, Gunther L.; and Lederer, Johann, 4,021,254.

Lee, Chen Yi: *See—*
Bolle, Fred; Lee, Chen Yi; and Tardiff, Daniel A., 4,021,679.

Lee, Fui-Tseng H., to FMC Corporation. Storage-stable detergent composition containing sodium perborate and activator. 4,021,361, Cl. 252-102.000.

Lee, Kwan-Hua, to University of California, The Regents of the. Psoriasis treatment with retinoic acid analogs. 4,021,573, Cl. 424-318.000.

Leeds and Micallef: *See—*
Micallef, Lewis A., 4,020,982.

Lees-Smith, Bernard Ivor: *See—*
Green, Brian John; and Lees-Smith, Bernard Ivor, 4,021,733.

Legler, George; Hostettler, Hans; Lacoste, Jean-Pierre; and Schwab, Friedrich, to Precision Mfg. Inc. - Fabrication. Divider screen assembly. 4,020,604, Cl. 52-65.000.

Legler, William F., to Caterpillar Tractor Co. A/C fan and filter assembly. 4,021,212, Cl. 55-470.000.

Leigh Products, Inc.: *See—*
Porter, James T., 4,021,063.

Leitz, Louis: *See—*
Wurthner, Roland, 4,020,951.

Leland, Harold Lester: *See—*
Erickson, John Joseph; Leland, Harold Lester; and Mathisen, Einar Skau, 4,021,711.

Lelekova, Margarita Vladimirovna: *See—*
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.

Lemme, Charles D.: *See—*
Givens, William R.; and Lemme, Charles D., 4,021,203.

Lengyel, Sandor: *See—*
Fleischer, Bertalan; Gaal, Otto; Lengyel, Sandor; and Pioker, Gyula, 4,020,534.

Lenkova, Evdokia Mikhailovna, administrator: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.

Lenkova, Nina Karlovna, administrator: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.

Lesnick, George; and Marshall, John M., to Controlled Power Products Company. Oil pressure delay check valve and pressure switch for shutting off diesel engine upon drop in oil pressure. 4,020,818, Cl. 123-198.0DB.

Leu, Shih-Chin. Signal device indicating driving status of a car. 4,021,775, Cl. 340-71.000.

Lever Brothers Company: *See—*
Lamberti, Vincent; and Kogan, Susan L., 4,021,376.

Levine, Arnold M., to International Telephone and Telegraph Corporation. Submarine optical communication system with fiber optic depth compensator. 4,021,661, Cl. 250-199.000.

Levis, William W., Jr.: *See—*
Austin, Arthur L.; Levis, William W., Jr.; and Patton, John T., Jr., 4,021,385.

Lewis, James M.: *See—*
Newyear, Raymond W.; and Lewis, James M., 4,021,242.

Lewis Woolf Griptight Limited: *See—*
Hurst, Eric Kenneth, 4,020,964.

Lichtblau, George Jay. Resonant tag circuits having one or more fusible links. 4,021,705, Cl. 361-402.000.

Lichter, Sigmund J. One piece molded device. 4,020,532, Cl. 24-255.00R.

Lichtman, Irwin A.: *See—*
Sinka, Joseph V.; and Lichtman, Irwin A., 4,021,365.

Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Process for preparing tricyclic alcohols. 4,021,494, Cl. 260-617.00F.

Likhov, Vitaly Kuzmich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.

Lincoln Brass Works, Inc.: *See—*
Carlson, Everett W., 4,020,870.

Lind, Hanns, to Ciba-Geigy Corporation. Thiaalkyl phenols. 4,021,468, Cl. 260-470.000.

Lindberg, Victor: *See—*
Harris, Harvey H.; Lindberg, Victor; and Walsh, Dale M., 4,021,654.

Lindbladh, Stig; and Stahlberg, Wallis. Method and apparatus for removing skin from salted, seasoned or otherwise pre-treated fish, preferably herring filets. 4,020,528, Cl. 17-50.000.

Linde Aktiengesellschaft: *See—*
Streich, Martin; and Jakob, Fritz, 4,021,210.

Linder, Jerome; and Houlihan, William J., to Sandoz, Inc. Dibromination process. 4,021,492, Cl. 260-592.000.

Lindqvist, Lars-Hakan. Ice-prod. 4,020,551, Cl. 30-164.800.

Lindroth, Thomas A.; and Iammarino, Nicholas J., to Merck & Co., Inc. Thickening agent containing heteropolysaccharide S-10. 4,021,389, Cl. 260-17.4ST.

Lindstrom, Gustav Verner. Method of combining at least two chemical reaction components and apparatus for carrying out the method. 4,021,386, Cl. 260-2.5BC.

Linnman, Sven N. J., to Per Udden AB. Switching device for the control of, and reduction of power losses and radio disturbances associated with circuitry, comprising one or more switching members loaded by an inductance. 4,021,720, Cl. 321-44.000.

Lion Fat & Oil Co., Ltd.: *See—*
Ogoshi, Toshiaki; and Sekiguchi, Shizuo, 4,021,460.

Litchford, George B., to Litchstreet Co. Collision avoidance system. 4,021,802, Cl. 343-6.5LC.

Litchstreet Co.: *See—*
Litchford, George B., 4,021,802.

Litzell, John E.: *See—*
Cantley, George A.; and Litzell, John E., 4,020,713.

Livesay, Richard E., to Caterpillar Tractor Co. Cart construction. 4,020,959, Cl. 214-84.000.

LKB-Produkter AB: *See—*
Mosbach, Klaus H., 4,021,307.
Soderkvist, Anton; and Lycke, Hans, 4,021,118.

Locatell, Louis, Jr., to Polaroid Corporation. Thiol polymers. 4,021,416, Cl. 260-79.700.

Loge, Olaf: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.

Lohr & Bromkamp GmbH: *See—*
Krude, Werner, 4,020,648.
Krude, Werner, 4,020,650.

Lomelin Gallardo, Juan Manuel: *See—*
Morales Guerrero, Josefina C.; and Lomelin Gallardo, Juan Manuel, 4,021,262.

Long, Ernest L., Jr.: *See—*
Valentine, Kenneth H.; Long, Ernest L., Jr.; and Willey, Melvin G., 4,021,669.

Long, John Whitney: *See—*
Cooke, Anson Richard; Long, John Whitney; and Wiedman, Steven John, 4,021,230.

Longo, Joseph T.: *See—*
Andrews, Austin M., II; Clarke, John E.; Gertner, Edward R.; Longo, Joseph T.; and Eden, Richard C., 4,021,836.

Lonza Ltd.: *See—*
Tenud, Leander, 4,021,480.

Looker, Robert: *See—*
McLennan, Richard E.; and Looker, Robert, 4,020,770.

Lopiccolo, Mario T.; Schaffer, Max A.; and Jachyra, George A., to

United Technologies Corporation. Unitary fluidic angular rate sensor. 4,020,700, Cl. 73-516.0LM.

Lora, Thad A.: *See—*
Deeter, Ronald C.; Lora, Thad A.; and Pozniko, John M., 4,021,126.

Lorant, Istvan Stefan: *See—*
Benzon-Petersen, Boye Ditlef; and Lorant, Istvan Stefan, 4,020,618.

Lorenz, Roman R., to Sterling Drug Inc. 6-Ethylamino-2-picoline from 6-acetamido-2-picoline. 4,021,437, Cl. 260-296.00R.

Losel, Walter; Traunecker, Werner; and Hoefke, Wolfgang, to Boehringer Ingelheim GmbH. 3β-(α-L-althromethylosyl)-14β-hydroxybufa-4,20,22-trienolide and acylated derivatives thereof. 4,021,547, Cl. 424-182.000.

Losert, Wolfgang: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.

Losey, Jerry Earl; Witzel, John Richard; and Kauffman, Harry Dean, to Cincinnati Milacron, Inc. Apparatus for controlling tool feed mechanism on an EDM machine. 4,021,635, Cl. 219-69.00G.

Louis, Charles R.; and Ulanski, Lawrence J., to Ford Motor Company. Slag pot transfer trailer. 4,020,960, Cl. 214-390.000.

Lubrizol Corporation, The: *See—*
Habiby, Emile Najib; and Jahnke, Richard William, 4,021,333.
Karn, Jack Lee, 4,021,419.

Lucero, Ronald Ray. Method providing chess apparatus. 4,021,043, Cl. 273-131.0AB.

Luck, Oral W., to Raymond Lee Organization, Inc., The, a part interest. Rotary ground breaker, soil pulverizer and pasture renovator. 4,020,907, Cl. 172-554.000.

Ludt, Roy R.; Eggert, Carl A.; and Skarman, John, to Wellen Industries. Smoke alarm. 4,021,792, Cl. 340-237.500.

Luff, Stanley Herbert, to Humbrol Limited. Spray gun. 4,020,990, Cl. 239-346.000.

Lummus Company, The: *See—*
O'Sullivan, Thomas F.; and Korwin, Paul, 4,020,772.

Lundberg, Thorsten: *See—*
Karlsson, Kurt; and Lundberg, Thorsten, 4,021,011.

Lundblad, Leif, to Inter Innovation A.B. Banknote dispensing machine. 4,020,972, Cl. 221-13.000.

Lunt, Richard R.: *See—*
Field, Edwin L.; Lamantia, Charles R.; Lunt, Richard R.; Oberholtzer, James E.; and Valentine, James R., 4,021,202.

Luperti, Harry E.: *See—*
Irvine, Robert; and Luperti, Harry E., 4,020,615.

Lure Camera Ltd.: *See—*
Millett, James A., 4,021,114.

Lurie, Alexandr Nesanelevich: *See—*
Dukshtau, Alexandr Antonovich; Prutkovsky, Samuil Alexandrovich; Detinko, Felix Moiseevich; Golubentsev, Jury Sergeevich; and Lurie, Alexandr Nesanelevich, 4,021,691.

Lurssen, Klaus: *See—*
Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, 4,021,221.

Lutterschmidt, Sigmund P. Positive hydraulic direct drive for vehicles. 4,020,917, Cl. 180-66.00R.

Lutz, Albert William; and Diehl, Robert Eugene, to American Cyanamid Company. 2-Chloro-N-isopropyl-2',3'-dimethylacetanilide as a herbicidal agent. 4,021,483, Cl. 260-562.00B.

Lycke, Hans: *See—*
Soderkvist, Anton; and Lycke, Hans, 4,021,118.

Lyon, Robert, to Bristol-Myers Company. Pressure filter. 4,021,354, Cl. 210-477.000.

Lyons, James E., to Sun Ventures, Inc. Ion-exchanged transition metal catalysts for the direct oxidation of olefins to epoxyalcohols. 4,021,369, Cl. 252-428.000.

M & T Chemicals Inc.: *See—*
Banczak, Daniel Philip; and Tan, William Eric, 4,021,252.
Touval, Irving, 4,021,406.

Mabuchi, Kenichi, to Mabuchi Motor Co. Ltd. Battery powered pump. 4,021,150, Cl. 417-411.000.

Mabuchi Motor Co. Ltd.: *See—*
Mabuchi, Kenichi, 4,021,150.

Macey, Frank G., to GTE Sylvania Incorporated. Push-pull power amplifier. 4,021,684, Cl. 307-268.000.

Macfarlane, Peter G.: *See—*
Frazerhurst, Lyndon F.; Robinson, Anthony J.; and Macfarlane, Peter G., 4,020,993.

Machida, Yukihiko, to Sony Corporation. Phase compressor for phase modulated signal. 4,021,742, Cl. 329-50.000.

MacPherson, William Frederick: *See—*
Jones, Charles Elmer, Jr.; and MacPherson, William Frederick, 4,021,617.

Mader, Robert J. Golf driver club. 4,021,047, Cl. 273-167.00H.

Maeder, Claude; and Sutter, Jean Georges, to Pont-A-Mousson S.A. Motor-equipped control device for a valve adjusting rod. 4,021,015, Cl. 251-133.000.

Magee, Francis Robert, Jr.: *See—*
Gitlin, Richard Dennis; and Magee, Francis Robert, Jr., 4,021,738.

Magnavox Company, The: *See—*
Nuxhall, Orville Gene; and Carlton, Donald Thomas, 4,020,676.

Magstar Engineering Co., Ltd.: *See—*
Shigyo, Genshichi; and Nishio, Takuji, 4,020,597.

Magyar Tudomanyos Akademia Szerves Kemiai Technologiai Tanszek: *See—*
Petro, Jozsef; Mathe, Tibor; Tungler, Antal; and Csuros, Zoltan, 4,021,374.

Magyar Vagon- es Gepgyar: *See—*
Toth, Istvan; and Prepost, Kalman, 4,020,716.

Mahon, Joseph J.; Redfield, William; and Supel, Ignacy, to Singer Company, The. Expanded scale timer. 4,020,625, Cl. 58-21.130.

Maillefer S.A.: *See—*
Compagnon, Michel, 4,020,524.

Mailloux, Robert J.: *See—*
Schell, Allan C.; and Mailloux, Robert J., 4,021,812.

Major, Frederick William; and Nicolle, Francois Marcel Andre, to Canadian International Paper Company. Vanillin recovery process. 4,021,493, Cl. 260-600.00A.

Makino, Michio; Kawai, Takashi; Takahashi, Ryoji; Kubo, Yoshimi; and Obata, Fumio, to Hitachi Metals, Ltd. Cast iron melting process. 4,021,232, Cl. 75-12.000.

Makino, Yoshimi; and Ookubo, Hiroyuki, to Sony Corporation. Magnetic field sensing apparatus for sensing the proximity of a member having high magnetic permeability without requiring an external field source. 4,021,728, Cl. 324-41.000.

Male, George H.: *See—*
Broberg, Frederick N., 4,020,827.

Malecha, Richard J.: *See—*
Darnell, William E.; and Malecha, Richard J., 4,020,915.

Mallion, Keith Blakeney, to Imperial Chemical Industries Limited. Process for producing enone intermediates. 4,021,425, Cl. 260-240.00R.

Malphettes, Jean; and Fontanet, Pierre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. System for controlling pressure by acoustic means. 4,020,859, Cl. 137-14.000.

Manecke, Siegfried E.: *See—*
Hild, Henry F.; and Manecke, Siegfried E., 4,021,094.

Manning, Donald L. Combined vent and escape hatch. 4,021,073, Cl. 296-137.00B.

Manning, Kenzel P.: *See—*
Baker, Donald H.; Bowe, Larry J.; Manning, Kenzel P.; and Post, William C., 4,021,009.

Manowitz, Milton: *See—*
Virgilio, Joseph A.; and Manowitz, Milton, 4,021,471.

Manqury, Philippe Michel Jacques: *See—*
Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, 4,021,567.

Mansfield, Peter: *See—*
Garroway, Allen Nathan; Grannell, Peter Kevin; and Mansfield, Peter, 4,021,726.

Marasco, Nicholas P.: *See—*
Piotrowski, Casimir F.; Scidmore, Wright H.; O'Shaughnessy, Robert P.; Marasco, Nicholas P.; Cerrato, Louis R.; and Haines, Clarence C., Jr., 4,020,739.

Maremont Corporation: *See—*
Givens, William R.; and Lemme, Charles D., 4,021,203.

Mariaulle, Claude, to Automatisation-Sogemo. Coupling assemblies. 4,021,062, Cl. 285-39.000.

Marks, James A. Choke collar for pets. 4,020,795, Cl. 119-106.000.

Marr, George, to Burroughs Corporation. Capacitor memory cell. 4,021,788, Cl. 340-173.0CA.

Marshall, John; and Kaplan, Samuel, to United States of America, Energy Research and Development Administration. Improved nuclear fuel assembly grid spacer. 4,021,300, Cl. 176-78.000.

Marshall, John M.: *See—*
Lesnick, George; and Marshall, John M., 4,020,818.

Marteau D'Autry, Eric. Pipette which may be calibrated. 4,020,698, Cl. 73-425.600.

Martens, Alexander E., to Bausch & Lomb Incorporated. High resolution distance measuring apparatus. 4,021,116, Cl. 356-4.000.

Martin, Wilhelm N., to Consolidated-Bathurst Limited. Apparatus for flame bonding by use of high velocity, high temperature direct flame. 4,021,287, Cl. 156-497.000.

Martinez, Javier A. Receiver for spent shells. 4,020,738, Cl. 89-33.00F.

Marting, Donald G.: *See—*
Hutar, William F.; and Marting, Donald G., 4,021,078.

Martiniere, Jean-Pierre G.: *See—*
Le Coquil, Emile F.; Amicel, Jean C.; and Martiniere, Jean-Pierre G., 4,021,851.

Maruzen Oil Co. Ltd.: *See—*
Fujiwara, Hiroshi; and Suzuki, Hiroshi, 4,021,403.

Marvin Glass & Associates: *See—*
Barlow, Gordon A.; and Nix, Donald F., 4,020,588.
Barlow, Gordon A., 4,021,046.

Maschinenfabrik Fahr Aktiengesellschaft: *See—*
Purrer, Josef, 4,020,995.

Mashimo, Yukio: *See—*
Iura, Yukio; Yamamichi, Masayoshi; Uchiyama, Takashi; Taguchi, Tetsuya; and Mashimo, Yukio, 4,021,828.
Uchiyama, Takashi; Mashimo, Yukio; Nakamura, Zenzo; and Sugiura, Yoji, 4,021,824.

Maslenko, Jury Savvich: *See—*
Shulzhenko, Alexandr Alexandrovich; Vitjuk, Viktor Ivanovich; and Maslenko, Jury Savvich, 4,021,171.

Massaro, Joseph. Full self-propelled lawn mower. 4,020,619, Cl. 56-11.200.

Masson Scott Thrissell Engineering Limited: *See—*
Byrt, Graham A. B.; and Mockett, John E., 4,020,722.
Mast, William C.: *See—*
Conrad, Daniel T.; Mast, William C.; and Wathen, Tom M., 4,021,504.
Masterson, Albert C. Fingernail and hand cleaning appliance. 4,020,856, Cl. 132-74.500.
Mastroianni, Sal Thomas: *See—*
Hunt, Merrill Roe; Ladas, Christopher Angelos; and Mastroianni, Sal Thomas, 4,021,270.
Masuda, Takao: *See—*
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,021,249.
Sashihara, Kenji; Masuda, Takao; Yamashita, Hiroshi; and Noguchi, Yasuhiro, 4,021,250.
Masuhara, Toshiaki: *See—*
Etoh, Jun; and Masuhara, Toshiaki, 4,021,835.
Mathe, Tibor: *See—*
Petro, Jozsef; Mathe, Tibor; and Tungler, Antal, 4,021,371.
Petro, Jozsef; Mathe, Tibor; Tungler, Antal; and Csuros, Zoltan, 4,021,374.
Mathews, Bernard C. Method and apparatus for drying grain. 4,020,561, Cl. 34-13.000.
Mathieu, Norman A.: *See—*
Edin, Ronald E.; and Mathieu, Norman A., 4,021,769.
Mathisen, Einar Skau: *See—*
Erickson, John Joseph; Leland, Harold Lester; and Mathisen, Einar Skau, 4,021,711.
Matkan, Josef, to Canon Kabushiki Kaisha. Method of and means for the development of electrostatic images. 4,021,586, Cl. 427-17.000.
Matsuda, Takayuki; Shimizu, Yoichi; Shimizu, Hiroki; Imazaki, Kazushi; and Nii, Setsuo, to Teikoku Piston Ring Co. Ltd.; and Honda Motor Co., Ltd. Sintered powdered ferrous alloy article and process for producing the alloy article. 4,021,205, Cl. 75-246.000.
Matsui, Noboru: *See—*
Chiku, Takewo; Ninomiya, Kiyoshi; Yoshida, Takashi; Kogiso, Takeshi; Hayashi, Hiroaki; and Matsui, Noboru, 4,021,255.
Matsui, Toru: *See—*
Tsujimoto, Kayoshi; and Matsui, Toru, 4,021,822.
Matsukawa, Hiroharu: *See—*
Kiritani, Masataka; Matsukawa, Hiroharu; Watanabe, Akio; and Imamiya, Hitoshi, 4,021,595.
Matsumoto, Koji: *See—*
Yano, Kimio; Nagai, Tadaaki; Matsumoto, Koji; Nagayasu, Motokiyo; and Tanaka, Junichi, 4,021,318.
Matsumoto, Teruo, to Epoch Company, Ltd. Electrical circuit board game. 4,021,044, Cl. 273-135.00A.
Matsunaga, Yasuyuki: *See—*
Takeno, Keigo; Matsunaga, Yasuyuki; Nomura, Ryoichi; and Nagata, Akihiro, 4,020,945.
Matsusaka, Tanechiyo, to Elepon Kabushiki Kaisha. Submersible pump with float switch. 4,021,144, Cl. 417-40.000.
Matsushima, Kanji: *See—*
Mitsuhashi, Kanzi; Matsushima, Kanji; and Miki, Osamu, 4,021,651.
Matsushita Electric Industrial Co., Ltd.: *See—*
Furuishi, Haruhisa; Kawamoto, Katsuaki; and Koyama, Yoneji, 4,021,717.
Miyagi, Kiyosi, 4,020,704.
Morimoto, Toshio; and Takamiya, Takehisa, 4,021,006.
Matsuyama Plow Mfg. Co., Ltd.: *See—*
Kobayasi, Makoto; and Hiramoto, Minoru, 4,020,908.
Matsuzaki, Hideomi: *See—*
Kamegaya, Takeo; Kaneko, Ryuichi; Matsuzaki, Hideomi; and Imahori, Yutaka, 4,021,695.
Mattel, Inc.: *See—*
Nuttall, Fleet E., 4,021,380.
May, Eric Raymond, to Stone Manganese Marine Limited. Marine propeller arrangement. 4,021,143, Cl. 416-174.000.
May, Francis A., to Consolidation Coal Company. Method for making a cable splice joining a pair of flexible conducting cables. 4,020,546, Cl. 29-628.000.
May, Jerzy: *See—*
Eckstein, Marian; May, Jerzy; Herdegen, Eleonora; and Kulig, Daniel, 4,021,473.
Mayberry, Douglas W.: *See—*
Ellsworth, Archibald B.; Mayberry, Douglas W.; Roden, William A.; and Roye, Cleveland E., 4,021,840.
Mayer, Hans Johann: *See—*
Fischli, Albert Eduard; Klaus, Michael Josef; Mayer, Hans Johann; and Wick, Alexander Eduard, 4,021,446.
Mayer, Johann: *See—*
Eiscle, Wolfgang; Petersen, Harro; Mayer, Johann; and Wittmann, Otto, 4,021,413.
Mayerhoefer, Horst; Mueller, Wolfgang; and Sollberger, Urs, to Sandoz Ltd. Boric acid esters. 4,021,464, Cl. 260-462.00R.
Mayhew, Theron T., to Hopkins Manufacturing Corporation. Apparatus for displaying and manipulating an indoor/outdoor thermometer. 4,020,694, Cl. 73-343.00R.
McAtee, James L. Console caddy. 4,020,986, Cl. 224-42.42R.
McCann, John J.; McCann, Mary A.; Plummer, William T.; Seiden, Myron A.; and Walworth, Vivian K., to Polaroid Corporation. Adapter for operatively coupling an automated camera to an optical instrument. 4,021,825, Cl. 354-79.000.
McCann, Mary A.: *See—*
McCann, John J.; McCann, Mary A.; Plummer, William T.; Seiden, Myron A.; and Walworth, Vivian K., 4,021,825.
McCartney, Ronald L.; Hogan, Vaughn C.; Landgreen, Eleanor A.; and Bauerkemper, Michael I., to International Telephone and Telegraph Corporation. Fiber bundle consolidation. 4,021,098, Cl. 350-96.00C.
McCauley, Jerry L.: *See—*
English, David C.; McCauley, Jerry L.; and Holmstrom, Godfrey A., 4,020,911.
McClung, Carl L.: *See—*
Kern, Richard A.; McClung, Carl L.; and Turner, James R., 4,020,809.
McConnell, George A., to Sperry Rand Corporation. Power transmission. 4,021,706, Cl. 361-210.000.
McCoy, Frank L.; and King, Earl R., to American Chain & Cable Company, Inc. Piston molding machine. 4,020,894, Cl. 164-343.000.
McDermott, Hugh L., to Eaton Corporation. Rotary fluid pressure device and thrust absorbing arrangement therefor. 4,021,161, Cl. 418-61.00B.
McDonald, Charles H. Method and composition for surfacing and repairing broken pavements with an elastomeric material having improved flexing properties at freezing temperatures without any significant loss of viscosity at high application temperatures. 4,021,393, Cl. 260-28.5AS.
McGraw-Edison Company: *See—*
Neidhardt, Graham B.; and Persak, George, Jr., 4,021,213.
McKay, Gene Darrell, to Abbott Laboratories. Process for disguising saline taste of pharmaceuticals and product thereof. 4,021,543, Cl. 424-180.000.
McKay, John P.: *See—*
Handren, Ralph M.; and McKay, John P., 4,021,273.
McKee, Albert: *See—*
Pollack, William; and McKee, Albert, 4,021,540.
McKee, Donald S.: *See—*
Upton, Albert E.; and McKee, Donald S., 4,020,888.
McKenna, James Michael, to Du Pont de Nemours, E. I., and Company. Alkyl acrylate polymer having less odor. 4,021,400, Cl. 260-30.200.
McKeon, John F.; and Lambert, Roy E., to FMC Corporation. Bushing link chain. 4,020,712, Cl. 74-250.00R.
McLaughlin, Robert L.; and Wood, Donald C., to DeSoto, Inc. Powder detergent compositions. 4,021,360, Cl. 252-99.000.
McLennan, Richard E.; and Looker, Robert, to Satron, Inc. Quick disconnect tie-down anchor. 4,020,770, Cl. 105-482.000.
McMahon, Donald H., to Sperry Rand Corporation. Distributive tee coupler. 4,021,097, Cl. 350-96.00C.
McNally, Paul F.: *See—*
Jones, Donald H.; Burig, Robert G.; and McNally, Paul F., 4,021,714.
McShane, James R. Pneumatic door locking system. 4,021,066, Cl. 292-144.000.
Mead Johnson & Company: *See—*
Lawson, John E.; and Dennis, Ronald D., 4,021,562.
Medovar, Boris Izrailevich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.
Meguerian, Garbis H.; and Rakowsky, Frederick W., to Standard Oil Company (Indiana). Catalyst for reducing oxides of nitrogen in the exhaust gas from internal combustion engines and process for making the catalyst. 4,021,372, Cl. 252-465.000.
Mehdizadeh, Parviz; and Casad, Burton M., to Continental Oil Company. Apparatus and method for determining corrosion fatigue inhibitor effectiveness. 4,020,680, Cl. 73-86.000.
Meier, Carl H., to Gulf & Western Industries, Inc. Up/down counter with a tracking 5/6 input circuit. 4,021,646, Cl. 235-92.0PL.
Meier, Carl H., to Gulf & Western Industries, Inc. Electronic monitoring device for power press brakes and similar devices. 4,021,647, Cl. 235-92.0TF.
Meihofer, Edward F., to Butler Automatic, Inc. Auto-splice system. 4,021,002, Cl. 242-58.100.
Meihofer, Edward F.; and DiGirolamo, Tony P., to Butler Automatic, Inc. Web alignment system. 4,021,031, Cl. 226-20.000.
Meindl, Peter: *See—*
Cullen, Ernest; Meindl, Peter; Tuppy, Hans; and Bodo, Gerhard, 4,021,551.
Meissner, Bernd: *See—*
Horn, Peter; Teege, Gernot; Fliege, Werner; Weiss, Frank; and Meissner, Bernd, 4,021,408.
Mentrup, Anton: *See—*
Schromm, Kurt; Mentrup, Anton; Renth, Ernst-Otto; and Traunecker, Werner, 4,021,485.
Menzin, Marvin: *See—*
Kirkpatrick, Harold B.; Distler, Edward C.; and Menzin, Marvin, 4,020,832.
Merck & Co., Inc.: *See—*
Hartman, George D., 4,021,438.
Lindroth, Thomas A.; and Iammarino, Nicholas J., 4,021,389.
Remy, David C.; and Britcher, Susan F., 4,021,561.

Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Seyfried, Christoph; and Nowak, Herbert, 4,021,555.
Meredith, Louis O.: *See—*
Castro, Raoul; Kleist, Herbert H.; and Meredith, Louis O., 4,020,787.
Mermelstein, Seymour. Game piece retaining. 4,021,045, Cl. 273-136.00D.
Merrell, Richard G.: *See—*
Collins, Johnny; Merrell, Richard G.; and Blass, David A., 4,021,741.
Merryman, Bob D.: *See—*
True, Howard D. F., Jr.; Merryman, Bob D.; and Gelbard, Robert B., 4,020,644.
Messer Griesheim GmbH: *See—*
Schmidt, Jurgen; and Hesse, Jurgen, 4,021,517.
Messerschmitt-Bolkow-Blohm GmbH: *See—*
Held, Manfred; and Spies, Johann, 4,021,057.
Metcalf, John W. Convertible electric tester for use with a flashlight and including a jack plug with tubular shunt. 4,021,732, Cl. 324-53.000.
Metropolitan Circuits, Inc.: *See—*
Cuneo, Edward A.; Kato, Makoto; and Wilson, Michael S., 4,020,535.
Meyer, Andreas: *See—*
Seffinga, Jouke; and Meyer, Andreas, 4,020,591.
Meyer, Lee G.: *See—*
Cuscurida, Michael; Meyer, Lee G.; and Watts, Lewis W., Jr., 4,021,383.
Micallef, Lewis A., to Leeds and Micallef. Rotary shut-off nozzle. 4,020,982, Cl. 222-554.000.
Michal, Dorothy Hamilton. Magnetic floating fishing tackle box. 4,020,584, Cl. 43-57.50R.
Michalowicz, William, to American Color & Chemical Corporation. Preparation of m-amino-α-methylbenzyl alcohol. 4,021,487, Cl. 260-580.000.
Michetti, Anthony: *See—*
Myers, Felix E.; Ball, Kenneth D.; Michetti, Anthony; and Warner, Charles E., 4,021,632.
Michihata, Nobuharu: *See—*
Sato, Teruo; and Michihata, Nobuharu, 4,021,752.
Micro Pneumatic Logic, Inc.: *See—*
Greene, Sanford I., 4,020,784.
Miesterfeld, Frederick Otto Richard, to Chrysler Corporation. Resonant sensor using a phase locked loop detector. 4,021,681, Cl. 307-233.00A.
Mihara, Yuji: *See—*
Hinata, Masanao; and Mihara, Yuji, 4,021,247.
Miki, Osamu: *See—*
Mitsuhashi, Kanzi; Matsushima, Kanji; and Miki, Osamu, 4,021,651.
Milberger, Ernest C.: *See—*
Dolhyj, Serge R.; and Milberger, Ernest C., 4,021,427.
Miles Laboratories, Inc.: *See—*
Borchert, Peter Jochen; and Neff, Jerry Lee, 4,021,377.
Miles, Wilbur Nelson: *See—*
Benjamin, Milton Lloyd; and Miles, Wilbur Nelson, 4,021,132.
Miller, Fredric S., to Universal Manufacturing Corporation. Automatic capacitor winding machine. 4,020,727, Cl. 83-580.000.
Miller, Gene S.: *See—*
Knapp, Lester L.; and Miller, Gene S., 4,021,317.
Miller, Jack V., to Acroform. Jack stand. 4,021,012, Cl. 248-352.000.
Millett, James A., to Lure Camera Ltd. Film strip controller. 4,021,114, Cl. 355-41.000.
Mills, John E.: *See—*
Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, 4,021,457.
Milne, Alexander; and Hails, George, to International Paint Company Limited, The. Marine paint. 4,021,392, Cl. 260-28.50A.
Mimms, Vernon, to United States of America, Air Force. Laser target simulator. 4,021,662, Cl. 250-203.00R.
Minakata, Matsuo: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,020,657.
Minasevich, Jury Vladislavovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.
Mineo, Joseph S. Toothpaste holder and dispenser combination. 4,020,976, Cl. 222-103.000.
Minezima, Yukihiko: *See—*
Hinoshita, Shigehiko; and Minezima, Yukihiko, 4,021,799.
Minnich, Elmer: *See—*
Chaya, John E.; Bredbenner, Charles; Minnich, Elmer; and Branz, Francis, 4,021,379.
Minnick, Robert C.: *See—*
Aiken, Howard H., deceased; Bailey, Paul T.; and Minnick, Robert C., 4,021,790.
Minolta Camera Kabushiki Kaisha: *See—*
Ozaki, Yoshihiro; Saijo, Takao; Ishii, Kenjiro; Omata, Yasukuni; and Kondo, Shoji, 4,021,108.
Sekida, Minoru, 4,021,829.
Tajima, Yuzo; and Okada, Toru, 4,020,568.
Tsujimoto, Kayoshi; and Matsui, Toru, 4,021,822.
Yamada, Seiji, 4,021,698.
Mishcon, Lester; and Reagan, Donald William, to Singer Company, The. Sinker top circular knitting machine for producing loop fabric. 4,020,653, Cl. 66-93.000.
Mitchell, Michael J.: *See—*
Baum, Peter N.; and Mitchell, Michael J., 4,021,739.
Mitrovich, Svetislav: *See—*
Daley, Howard L.; Davidson, Gerald S.; and Mitrovich, Svetislav, 4,020,940.
Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Iijima, Katsuhiko; and Jomen, Katsumasa, 4,020,745.
Koizumi, Mokuji; and Kobayashi, Yukitsugu, 4,020,664.
Koizumi, Mokuji; and Kobayashi, Yukitsugu, 4,020,665.
Mitsubishi Seiko Kabushiki Kaisha: *See—*
Sato, Kazuhiro, 4,020,885.
Mitsuhashi, Kanzi; Matsushima, Kanji; and Miki, Osamu, to Kawasaki Jukogyo Kabushiki Kaisha. Programmed manipulator. 4,021,651, Cl. 235-151.110.
Mitsui Mining & Smelting Co., Ltd.: *See—*
Kojima, Hiromitsu; and Yoshida, Kimio, 4,020,944.
Mukae, Satoshi; and Yokokawa, Kiyosi, 4,021,199.
Miyagi, Kiyosi, to Matsushita Electric Industrial Co., Ltd. Pushbutton tuner. 4,020,704, Cl. 74-10.330.
Miyaki, Kiyoshi: *See—*
Yagi, Shizuo; and Miyaki, Kiyoshi, 4,020,808.
Miyashita, Takao: *See—*
Kuwabara, Kooji; Sugawara, Hiroyuki; and Miyashita, Takao, 4,021,633.
Miyata, Katsuhiko, to Asahi Kogaku Kogyo Kabushiki Kaisha. Photometric device built into viewfinder system for a single lens reflex camera. 4,021,823, Cl. 354-31.000.
Miyauchi, Toshiyuki; and Ohtsuka, Kunio, to Nissan Motor Co., Ltd. Hydraulic system for an automatic power transmission. 4,020,718, Cl. 74-869.000.
Mizuno, Hitoshi; and Akiyama, Satoshi, to Kabushiki Kaisha Shikutani. Mowing apparatus. 4,020,552, Cl. 30-276.000.
Moakler, William A.; and Stotz, Charles, to Automatic Switch Company. Automatic transfer switch. 4,021,678, Cl. 307-64.000.
Mobil Oil Corporation: *See—*
Allen, Linus S., 4,021,666.
Braid, Milton, 4,021,470.
Ciric, Julius, 4,021,331.
Cook, Thomas W.; and Quaglino, Carl A., 4,021,772.
Gorring, Robert L.; Scott, Eric J. Y.; and Smith, Robert L., 4,021,334.
Plank, Charles J.; Rosinski, Edward J.; and Givens, Edwin N., 4,021,502.
Rubin, Mae K.; Plank, Charles J.; and Rosinski, Edward J., 4,021,447.
Schwab, Frederick C., 4,021,359.
Wilson, Robert C., Jr.; and Schwartz, Albert B., 4,021,332.
Mochizuki, Manabu: *See—*
Kuroishi, Shoji; and Mochizuki, Manabu, 4,021,111.
Mockett, John E.: *See—*
Byrt, Graham A. B.; and Mockett, John E., 4,020,722.
Moeglich, Karl, to Silrec Systems, Inc. Electrolytic process for recovery of silver from photographic fixer solution. 4,021,319, Cl. 204-96.000.
Moeglich, Karl, to Silrec Systems, Inc. Electrochemical process utilizing alternating current for recovery of silver from photographic fixer solution and other solutions containing silver ions. 4,021,320, Cl. 204-96.000.
Moeltner, Hermann: *See—*
Demny, Werner; and Moeltner, Hermann, 4,020,667.
Moffat, Robert B.; Nystuen, David L.; and Imdieke, Thomas H., to Economics Laboratory, Inc. Remote powder detergent dispenser. 4,020,865, Cl. 137-268.000.
Molchanjuk, Valery Matveevich: *See—*
Gubsky, Alexei Alexeevich; Borisevich, Vladimir Karpovich; Volkov, Anatoly Ivanovich; and Molchanjuk, Valery Matveevich, 4,020,663.
Mold, Donald F.; and Rice, Ronald G., to Owens-Illinois, Inc. Ceramic structural material. 4,020,896, Cl. 165-10.000.
Mole, Robert Alan. Solar energy system. 4,020,826, Cl. 126-270.000.
Molins Limited: *See—*
Hirsh, Ivan Y., 4,020,675.
Moller, Hinrich; Osberghaus, Rainer; Gloxhuber, Christian; and Braig, Siegfried, to Henkel & Cie G.m.b.H. Skin treating cosmetic compositions containing N-polyhydroxyalkyl-amines. 4,021,539, Cl. 424-73.000.
Monostory, Adorjan: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Siposs, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.
Monsanto Company: *See—*
Aiken, Howard H., deceased; Bailey, Paul T.; and Minnick, Robert C., 4,021,790.
Dolan, Michael J., 4,021,322.
White, Donald A., 4,021,321.
Montefusco, Nicola, to Societa Italiana Telecomunicazioni Siemens S.p.A. Demodulator for frequency-keyed communication system. 4,021,744, Cl. 329-105.000.
Monthony, James F.: *See—*
Delony, Timothy Edwin; Gangwer, James R.; and Monthony, James F., 4,021,324.

Moore, James D.: *See*—
Ryan, John W.; and Moore, James D., 4,020,925.

Moore, Robert Milton, to RCA Corporation. Method of fabricating polycrystalline selenium imaging devices. 4,021,375, Cl. 252-501.000.

Moore, Ronald D.: *See*—
Hall, Frank Kenneth; and Moore, Ronald D., 4,021,643.

Morales Guerrero, Josefina C.; and Lomelin Gallardo, Juan Manuel, to Instituto Mexicano de Investicaciones Tecnologicas, A.C. Composition of matter for the coating of plant products for their preservation and process of making same. 4,021,262, Cl. 106-271.000.

Morduchowitz, Abraham; Jordan, Terence B.; and Rubin, Isaac D., to Texaco Inc. Multifunctional tetrapolymer lube oil additive. 4,021,357, Cl. 252-51.50A.

Morgan, Leo J., to Raymond Lee Organization, Inc., The, a part interest. Alternate toilet bowl flush apparatus. 4,020,508, Cl. 4-67.00A.

Morii, Kokichi; and Urayama, Ken-Ichi, to Sony Corporation. Filter circuit having an acoustic surface-wave filter device. 4,021,761, Cl. 333-72.000.

Morimoto, Toshio; and Takamiya, Takehisa, to Matsushita Electric Industrial Co., Ltd. Container for magnetic tape. 4,021,006, Cl. 242-199.000.

Morioka, Akira: *See*—
Ijichi, Ichiro; Kai, Shigetoshi; Teranishi, Hikaru; Morioka, Akira; and Seki, Kazuyoshi, 4,021,391.

Morita, Shizuo, to Konishiroku Photo Industry Co., Ltd. Electrophotographic duplication method and apparatus therefor. 4,021,107, Cl. 355-3.00R.

Morita, Yasuyuki; and Kodama, Hiroshi, to Toyo Kogyo Co., Ltd. Rotary-piston engine housing. 4,021,163, Cl. 418-83.000.

Morozov, Viktor Prokofievich: *See*—
Gorchakov, Mikhail Fedorovich; Kabakov, Mikhail Grigorievich; Kashtanov, Leonid Nikolaevich; Morozov, Viktor Prokofievich; Chuprakov, Jury Ivanovich; and Scherbakov, Vitaly Fedorovich, 4,021,154.

Morris, George W. Snap-on bow-mounted quiver. 4,020,984, Cl. 224-1.00B.

Morrison, Johnny Randall, to B & J Machinery Co., Inc. Apparatus and method for raising and transporting poultry. 4,020,793, Cl. 119-18.000.

Mortensen, Harold Richard, to Facet Enterprises, Inc. Direct cranking starter drive. 4,020,935, Cl. 192-104.00R.

Mortl, Gunther L.; and Lederer, Johann. Refractories using boric acid and water soluble alcohol binder. 4,021,254, Cl. 106-58.000.

Morton-Norwich Products, Inc.: *See*—
Pelosi, Stanford S., Jr., 4,021,444.

Morton, William G. Inter-liner for a safety helmet. 4,020,507, Cl. 2-411.000.

Mosbach, Klaus H., to LKB-Produkter AB. Method and apparatus for measuring temperature changes generated by enzyme activity. 4,021,307, Cl. 195-103.50R.

Moskowitz, Seymour. Hydraulic fluid devices. 4,021,148, Cl. 417-383.000.

Moss, Stanley D.: *See*—
Johnson, Curtis C.; Moss, Stanley D.; and Janata, Jiri A., 4,020,830.

Mossey, John G.: *See*—
Davis, Donald H.; and Mossey, John G., 4,020,869.

Motorola, Inc.: *See*—
Davies, Robert Bruce, 4,021,701.
Dounce, Eric Alexander; and Westbrook, Gregory Lee, 4,021,804.
Gay, Michael J., 4,021,610.
Hunt, Merrill Roe; Ladas, Christopher Angelos; and Mastroianni, Sal Thomas, 4,021,270.
Sharp, Ronald Edward; and Willard, David Frank, 4,021,653.

Motoyama, Kazuyasu; and Kato, Toshikazu, to Olympus Optical Co., Ltd. Cassette tape recorder. 4,021,856, Cl. 360-74.000.

Moyse, Bernard, to Sarmac S.A. Explosive projectile. 4,020,766, Cl. 102-80.000.

Mueller, Wolfgang: *See*—
Mayerhoefer, Horst; Mueller, Wolfgang; and Sollberger, Urs, 4,021,464.

Muir, Robert D.; and Sangar, Vijay K., to G. D. Searle & Co. String culture inoculum. 4,021,305, Cl. 195-54.000.

Mukae, Satoshi; and Yokokawa, Kiyosi, to Mitsui Mining & Smelting Co., Ltd. Automatic cleaning apparatus for electrodes of pH meter. 4,021,199, Cl. 23-253.00A.

Mukaida, Yutaka: *See*—
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, 4,021,390.

Muller, Ewald; and Becht, Reimund, to ITT Industries, Inc. Brake booster. 4,020,749, Cl. 92-48.000.

Muller, Hans; and Stumpp, Werner, to Dr. Ing. Hans Mueller. Method of measuring the turbidity of gas-containing liquid mediums with microorganisms. 4,021,120, Cl. 356-208.000.

Muller, Jurgen: *See*—
Pfeifer, Josef; Rheude, Alfred; Thate, Kurt; and Muller, Jurgen, 4,021,668.

Munter, Ernst August, to Northern Electric Company Limited. Incrementally adjustable digital attenuator/amplifier. 4,021,652, Cl. 235-152.000.

Murakami, Masuo; Takahashi, Kozo; Ozas , Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, to Yamanouchi Pharmaceutical Co., Ltd. Sodium β-[2,6-dimethyl-3,5-bis(ethoxycarbonal)-4-(3-nitrophenyl)-1,4-dihydropyridine-1-yl]ethyl sulfate. 4,021,434, Cl. 260-294.80R.

Murata, Ryozo: *See*—
Kojima, Hiroomi; Zama, Hideo; Nomura, Sadao; Tabuchi, Toyoji; and Murata, Ryozo, 4,021,798.

Murayama, Naohiro; Katto, Takayuki; Iizuka, Yo; and Sakagami, Teruo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Production of impact-resistant, thermoplastic resin compositions. 4,021,509, Cl. 260-880.00R.

Murphy, John V., to Sperry Rand Corporation. Method and apparatus for the magnetic storage of digital data. 4,021,853, Cl. 360-44.000.

Murray, James M. Dish stabilizer for dish washing machines. 4,021,088, Cl. 312-311.000.

Musgrove, Archie E. Object loading and unloading apparatus. 4,020,961, Cl. 214-450.000.

Myers, Felix E.; Ball, Kenneth D.; Michetti, Anthony; and Warner, Charles E., to I-T-E Imperial Corporation. Circuit breaker contact arm and attachment means. 4,021,632, Cl. 200-250.000.

Myler, George W.: *See*—
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., 4,020,821.

N.J. Phillips Pty. Limited: *See*—
Phillips, Ian Ross; and Reynolds, Mervyn Frank, 4,020,838.

Nadherny, Rudolph E., to Illinois Railway Equipment Company. Hatch cover locking mechanism for covered hopper cars. 4,021,067, Cl. 292-256.500.

Nadtochy, Jury Alexandrovich: *See*—
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.

Nafissi-Varchei, Mohammad Mehdi, to Schering Corporation. Treatment of oxyuriasis. 4,021,570, Cl. 424-300.000.

Nagai, Tadaaki: *See*—
Yano, Kimio; Nagai, Tadaaki; Matsumoto, Koji; Nagayasu, Motokiyo; and Tanaka, Junichi, 4,021,318.

Naganuma, Kazuo: *See*—
Kishi, Kazuo; and Naganuma, Kazuo, 4,021,275.

Nagare, Syoji; and Osawa, Kozo, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Oval pipe with a flat base. 4,020,639, Cl. 61-10.000.

Nagata, Akihiro: *See*—
Takeno, Keigo; Matsunaga, Yasuyuki; Nomura, Ryoichi; and Nagata, Akihiro, 4,020,945.

Nagatomo, Shigeru; and Hori, Kiyotaka, to Fuji Photo Film Co., Ltd. Silver halide photographic materials with surface layers comprising both alkali and acid produced gelatin. 4,021,244, Cl. 96-67.000.

Nagatomo, Shigeru; and Hori, Kiyotaka, to Fuji Photo Film Co., Ltd. Photographic light-sensitive material. 4,021,245, Cl. 96-67.000.

Nagayasu, Motokiyo: *See*—
Yano, Kimio; Nagai, Tadaaki; Matsumoto, Koji; Nagayasu, Motokiyo; and Tanaka, Junichi, 4,021,318.

Nagel, Johann Werner: *See*—
Furman, Anatol; Kalter, Howard Leo; and Nagel, Johann Werner, 4,021,789.

Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, to American Cyanamid Company. Complement inhibitors. 4,021,544, Cl. 424-180.000.

Nair, Vijay Gopalan; Joseph, Joseph Peter; and Bernstein, Seymour, to American Cyanamid Company. Complement inhibitors. 4,021,545, Cl. 424-180.000.

Najer, Henry: *See*—
Giudicelli, Don Pierre Rene Lucien; and Najer, Henry, 4,021,559.
Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, 4,021,567.

Nakabayashi, Yutaka, to Dai-Nippon Sugar Manufacturing Co., Ltd. Method for treatment of microorganisms. 4,021,303, Cl. 195-5.000.

Nakajima, Shunichi; and Hashimoto, Yoshiro, to Tokyo Shibaura Electric Co., Ltd. Paper sheets processing apparatus. 4,020,616, Cl. 53-54.000.

Nakamachi, Ichiro: *See*—
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.

Nakamura, Kohichi: *See*—
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.

Nakamura, Zenzo: *See*—
Uchiyama, Takashi; Mashimo, Yukio; Nakamura, Zenzo; and Sugiura, Yoji, 4,021,824.

Nakanishi, Kakusaburo; Yoshida, Tatsuro; and Nakatubo, Kyoku, to Ryo-Nichi Co., Ltd. Vinyl chloride -EPDM resin compositions. 4,021,508, Cl. 260-876.00R.

Nakano, Kinichi: *See*—
Fujimoto, Yasuo; Nakano, Kinichi; and Urakawa, Chikahiro, 4,021,449.

Nakase, Takamichi: *See*—
Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, 4,020,802.

Hattori, Tadashi; Iwata, Toshiharu; and Nakase, Takamichi, 4,020,813.
Nakatubo, Kyoku: *See—*
Nakanishi, Kakusaburo; Yoshida, Tatsuro; and Nakatubo, Kyoku, 4,021,508.
Nakazyo, Kiyoshi: *See—*
Shiba, Keisuke; Nakazyo, Kiyoshi; Ohi, Reiichi; and Adachi, Keiichi, 4,021,248.
Nalco Chemical Company: *See—*
Crill, Marla S., 4,021,260.
Hunter, Wood E.; and Vallino, Barney, 4,021,399.
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., 4,021,394.
Nanjyo, Toshio; and Aoshika, Masayuki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Roof for arc furnace. 4,021,603, Cl. 13-35.000.
Narey, James O.; and Saylor, William H. Ballot tallying system including a digital programmable read only control memory, a digital ballot image memory and a digital totals memory. 4,021,780, Cl. 340-172.500.
Naruishi, Tadayuki; Kataoka, Youichi; Sasabe, Haruyoshi; and Tutiya, Satoru, to Toshiba Ray-O-Vac Co., Ltd. Alkaline dry cell. 4,021,598, Cl. 429-206.000.
National Research Development Corporation: *See—*
Garroway, Allen Nathan; Grannell, Peter Kevin; and Mansfield, Peter, 4,021,726.
Spiatt, Reginald John Kingston, 4,021,683.
Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, to Bayer Aktiengesellschaft. Plant-growth-regulating compositions containing phospholanium salts. 4,021,221, Cl. 71-86.000.
NCR Corporation: *See—*
Betts, William L., 4,021,616.
Quaif, Richard S.; and Hays, John D., 4,020,939.
Neff, Jerry Lee: *See—*
Borchert, Peter Jochen; and Neff, Jerry Lee, 4,021,377.
Nei, Hiromichi; and Hashiguchi, Koh, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Method for removing impurities in liquid metal. 4,021,234, Cl. 75-66.000.
Neidhard, Horst: *See—*
Pollner, Rudolf; Friese, Karl-Hermann; Topp, Bernhard; and Neidhard, Horst, 4,021,326.
Neidhardt, Graham B.; and Persak, George, Jr., to McGraw-Edison Company. Food storage refrigeration cabinet having optional fast chill cycle. 4,021,213, Cl. 62-180.000.
Nelson, David M.; Stribrsky, William; and Britz, John A. Tennis teaching machine with ball projector. 4,021,036, Cl. 273-29.00A.
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, to Ceskoslovenska komise pro atomovou energii Praha. Process of treating mycelia of fungi for retention of metals. 4,021,368, Cl. 252-427.000.
Nemeth, Suzette: *See—*
Richman, Edward B.; Tomlinson, Seymour W.; Nemeth, Suzette; and Wilson, David W., 4,020,842.
Neomed Incorporated: *See—*
Taylor, Charles E., 4,021,630.
Nethery, Verlin. Portable animal feeding station. 4,020,794, Cl. 119-58.000.
Neuman, Clayton L., to A-1 Engineering, Inc. Plastic injection mold with self-adjusting coring apparatus. 4,021,515, Cl. 264-40.500.
New York Medical College: *See—*
Lange, Kurt; and Treser, Gerhard, 4,021,541.
New Zealand Inventions Development Authority: *See—*
Frazerhurst, Lyndon F.; Robinson, Anthony J.; and Macfarlane, Peter G., 4,020,993.
Newage Engineers Limited: *See—*
Bellew, Wilfred Thomas, 4,020,781.
Newbegin, John, to SI Handling Systems, Inc. Tow line accumulator. 4,020,768, Cl. 104-172.0BT.
Newell Companies, Inc.: *See—*
Chiames, George J., 4,021,128.
Newyear, Raymond W.; and Lewis, James M., to Horizons Incorporated, a division of Horizons Research Incorporated. Negative working photoresist material comprising a N-vinyl monomer, an organic halogen compound photoactivator and a maleic anhydride modified rosin and the use thereof. 4,021,242, Cl. 96-36.000.
Nexus Manufacturing Limited: *See—*
Sykes, Christopher C., 4,021,129.
Nichols, Dwight E.: *See—*
Hammond, Ronald D.; and Nichols, Dwight E., 4,020,967.
Nicholson Manufacturing Company: *See—*
Nicholson, Thomas W., 4,020,883.
Nicholson, Thomas W., to Nicholson Manufacturing Company. Feed works for rotary ring log barkers. 4,020,883, Cl. 144-208.00E.
Nickl, Josef: *See—*
Seeger, Ernst; Engel, Wolfhard; Nickl, Josef; and Teufel, Helmut, 4,021,479.
Nicolle, Francois Marcel Andre: *See—*
Major, Frederick William; and Nicolle, Francois Marcel Andre, 4,021,493.
Nielsen, Ralph R.: *See—*
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., 4,021,394.
Nihon Kogyo Kabushiki Kaisha: *See—*
Yuki, Toshihiro, 4,021,235.
Nii, Setsuo: *See—*
Matsuda, Takayuki; Shimizu, Yoichi; Shimizu, Hiroki; Imazaki, Kazushi; and Nii, Setsuo, 4,021,205.
Niimi, Itaru; Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; and Takahashi, Yoshitaka, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for manufacturing spherical hollow particles. 4,021,167, Cl. 425-7.000.
Ninomiya, Kiyoshi: *See—*
Chiku, Takewo; Ninomiya, Kiyoshi; Yoshida, Takashi; Kogiso, Takeshi; Hayashi, Hiroaki; and Matsui, Noboru, 4,021,255.
Nippon Electric Company, Ltd.: *See—*
Katagiri, Yoshio; and Suda, Ryuichi, 4,021,800.
Nippon Hoso Kyokai: *See—*
Kamegaya, Takeo; Kaneko, Ryuichi; Matsuzaki, Hideomi; and Imahori, Yutaka, 4,021,695.
Nippon Kynol Inc.: *See—*
Koyama, Hiroaki; and Kimura, Isao, 4,021,410.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See—*
Shimizu, Noboru; Yoshida, Sadao; Kubota, Kunihiro; and Ohara, Takashi, 4,021,310.
Nippon Soken, Inc.: *See—*
Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, 4,020,802.
Hattori, Tadashi; Iwata, Toshiharu; and Nakase, Takamichi, 4,020,813.
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,020,817.
Suzuki, Mikio; and Hattori, Yoshiyuki, 4,021,058.
Nishida, Minoru: *See—*
Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, 4,020,802.
Nishio, Takuji: *See—*
Shigyo, Genshichi; and Nishio, Takuji, 4,020,597.
Nishita, Sadao: *See—*
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, 4,021,390.
Nishitani, Kazuhisa: *See—*
Takemoto, Shigeji; and Nishitani, Kazuhisa, 4,021,005.
Nissan Motor Co., Ltd.: *See—*
Aoyama, Shunichi; and Hayashi, Yoshimasa, 4,020,806.
Ishikawa, Yoshikazu, 4,020,799.
Ishikawa, Yoshikazu, 4,020,800.
Izumi, Hisashi, 4,020,637.
Miyauchi, Toshiyuki; and Ohtsuka, Kunio, 4,020,718.
Nisshin Sangyo Kabushiki Kaisha: *See—*
Sumiyoshi, Toshinari, 4,020,867.
Nissin Shokuhin Kaisha, Ltd.: *See—*
Ando, Koki, 4,020,969.
Nitto Electric Industrial Co., Ltd.: *See—*
Ijichi, Ichiro; Kai, Shigetoshi; Teranishi, Hikaru; Morioka, Akira; and Seki, Kazuyoshi, 4,021,391.
Nix, Andrew B., to United States of America, Army. Tensile test sample making machine. 4,020,723, Cl. 83-268.000.
Nix, Donald F.: *See—*
Barlow, Gordon A.; and Nix, Donald F., 4,020,588.
Nixdorff, Frank S., to Anchor Hocking Corporation. Safety closure device. 4,020,981, Cl. 222-525.000.
NL Industries, Inc.: *See—*
Bayliss, Ronald W., 4,020,564.
Noakes, John E. Sealable high counting efficiency liquid scintillation vials. 4,021,670, Cl. 250-328.000.
Noble, Roy A., to Raymond Lee Organization, Inc., The, a part interest. Self-propelled shopping cart. 4,020,916, Cl. 180-65.00R.
Noda, Ichiro: *See—*
Takemoto, Tadashi; Kakizaki, Fusayoshi; Ariyoshi, Yasuo; and Noda, Ichiro, 4,021,418.
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, to Nippon Soken, Inc. Internal combustion engine. 4,020,817, Cl. 123-191.0SP.
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, to Fuji Photo Film Co., Ltd. Heat developable light-sensitive material incorporating a substituted s-triazine-2,4,6-(1H, 3H, 5H)-trione reducing agent. 4,021,249, Cl. 96-114.100.
Noguchi, Yasuhiro: *See—*
Sashihara, Kenji; Masuda, Takao; Yamashita, Hiroshi; and Noguchi, Yasuhiro, 4,021,250.
Nolen, Robert L., Jr.: *See—*
Budrick, Ronald G.; King, Frank T.; Nolen, Robert L., Jr.; and Solomon, David E., 4,021,253.
Nomura, Ryoichi: *See—*
Takeno, Keigo; Matsunaga, Yasuyuki; Nomura, Ryoichi; and Nagata, Akihiro, 4,020,945.
Nomura, Sadao: *See—*
Kojima, Hiroomi; Zama, Hideo; Nomura, Sadao; Tabuchi, Toyoji; and Murata, Ryozo, 4,021,798.
Nonaka, Kohei; and Sudo, Michio, to Asahi Kasei Kogyo Kabushiki Kaisha. Hall element and method of manufacturing same. 4,021,767, Cl. 338-32.00H.
Norback, Per, to Aktiebolaget Carl Munters. Method of manufacturing a contact body. 4,021,282, Cl. 156-210.000.
Norbeck, Dean K., to Borg-Warner Corporation. Phase sequence correcting system for three-phase AC power. 4,021,704, Cl. 361-77.000.
Nordal, Vegard: *See—*
Almen, Torsten; Haavaldsen, Johan; and Nordal, Vegard, 4,021,481.

Nordstrom, Cai Gustav Rabbe; and Veerhoff, Peter, to Boehringer Ingelheim GmbH. Catheter placement assembly. 4,020,835, Cl. 128-214.400.
Norell, John R.: *See—*
Fozzard, George B.; and Norell, John R., 4,021,465.
Norman, Thomas W. Self-storing step structure for vehicular mounting. 4,021,071, Cl. 296-62.000.
Norsk Kjettingindustri A-S Alf Nosted: *See—*
Daniel, Gordon, 4,020,886.
North American Philips Corporation: *See—*
Fellows, Mark, 4,021,727.
Northern Electric Company Limited: *See—*
Munter, Ernst August, 4,021,652.
Northrop Corporation: *See—*
Coxe, Frank S., 4,021,007.
Northup, John D. Child resistant closure. 4,020,965, Cl. 215-213.000.
Norton Company: *See—*
Kuriakose, Areekattuthazhayil K., 4,021,529.
Nose Cone Manufacturing Co., Inc.: *See—*
Hersh, Alan S., 4,021,069.
Nossen, Edward Joachim, to RCA Corporation. Phase lock-loop modulator using an arithmetic synthesizer. 4,021,757, Cl. 332-19.000.
Nothen, Gunther. Automatic filling of flower pots. 4,020,881, Cl. 141-1.000.
Novi Plastics Company: *See—*
Daniels, Phillip D., 4,020,602.
Daniels, Phillip D., 4,020,609.
Novozhilova, Zhanneta Viktorovna: *See—*
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.
Nowak, Herbert: *See—*
Seyfried, Christoph; and Nowak, Herbert, 4,021,555.
Nozawa, Masaaki: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.
Nurita, Joji: *See—*
Konomi, Toshiaki; Nurita, Joji; and Tanazawa, Yasushi, 4,020,805.
Nuttall, Fleet E., to Mattel, Inc. Expandable resin composition. 4,021,380, Cl. 260-2.5HA.
Nuttall, Richard T. Smoking pipe. 4,020,853, Cl. 131-195.000.
Nuxhall, Orville Gene; and Carlton, Donald Thomas, to Magnavox Company, The. Method and apparatus for collecting fluid contaminants. 4,020,676, Cl. 73-61.00R.
Nyegaard & Co. A/S: *See—*
Almen, Torsten; Haavaldsen, Johan; and Nordal, Vegard, 4,021,481.
Nystuen, David L.: *See—*
Moffat, Robert B.; Nystuen, David L.; and Imdieke, Thomas H., 4,020,865.
Oakes, Gilbert B., to Oakes, Gilbert B.; Branch, James R.; and Peabody, Roger A., part interest to each. Ski boot with sole cavity binding. 4,021,056, Cl. 280-613.000.
Obata, Fumio: *See—*
Makino, Michio; Kawai, Takashi; Takahashi, Ryoji; Kubo, Yoshimi; and Obata, Fumio, 4,021,232.
Oberbichler, Werner, to Tyrolit-Schleifmittelwerk Swarovski K.G. Abrasive article. 4,021,208, Cl. 51-295.000.
Oberheim, Heinz; and Katzer, Johann, to IWK Pressen GmbH. Press for the shaping of sheet metal without cutting. 4,020,671, Cl. 72-450.000.
Oberholtzer, James E.: *See—*
Field, Edwin L.; Lamantia, Charles R.; Lunt, Richard R.; Oberholtzer, James E.; and Valentine, James R., 4,021,202.
Obitz, Daniel Charles Leon: *See—*
Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, 4,021,567.
Obra, Bart R., to Easom Engineering & Manufacturing Corporation. Epicycloidal crank drive mechanism. 4,020,708, Cl. 74-52.000.
O'Brien, Darrell E.: *See—*
Springer, Robert H.; O'Brien, Darrell E.; and Simon, Lionel N., 4,021,556.
O'Brien, John W. Portable strain gauge. 4,020,681, Cl. 73-88.00R.
Oce-van der Grinten N.V.: *See—*
Jeppesen, Erling F., 4,021,115.
O'Connell, John J.: *See—*
Rockett, Thomas J.; Tiffany, John S.; and O'Connell, John J., 4,020,557.
Oda, Hiroshi; and Fukunaga, Hideki, to Howa Sangyo Kabushiki Kaisha. Diffusion-absorption type refrigerating machine. 4,020,646, Cl. 62-492.000.
Oda, Masamitsu, to Toyo Kogyo Co., Ltd. Impregnant. 4,021,256, Cl. 106-74.000.
O'Dell Manufacturing, Inc.: *See—*
Hall, Frank Kenneth; and Moore, Ronald D., 4,021,643.
Ofag Ofenbau-und Feuerungstechnik AG: *See—*
Hug, Franz O., 4,020,797.
Ogawa, Akira: *See—*
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,021,251.
Ogawa, Kazuaki, to Sony Corporation. Method of exposing parallel stripe-like areas on photosensitive member. 4,021,239, Cl. 96-27.00E.
Ogawa, Kazuhiro: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 4,021,316.
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, to Tomoegawa Paper Co., Ltd.; and Shin-Etsu Chemical Industry Co., Ltd. Planographic dry offset master plate. 4,020,761, Cl. 101-457.000.
Ogoshi, Toshiaki; and Sekiguchi, Shizuo, to Lion Fat & Oil Co., Ltd. Method for manufacturing α-sulfo fatty acid ester salt. 4,021,460, Cl. 260-400.000.
Oguino, Masanori: *See—*
Taniguchi, Yoshisada; Tsuji, Toshihiko; and Oguino, Masanori, 4,021,843.
O'Hara, Patrick L., to Fee International, Ltd. Knee ball exercise game apparatus. 4,021,035, Cl. 272-78.000.
Ohara, Takashi: *See—*
Shimizu, Noboru; Yoshida, Sadao; Kubota, Kunihiro; and Ohara, Takashi, 4,021,310.
Ohi, Reiichi: *See—*
Shiba, Keisuke; Nakazyo, Kiyoshi; Ohi, Reiichi; and Adachi, Keiichi, 4,021,248.
Ohkura, Toshihiko: *See—*
Shibano, Yoshizo; Hatano, Tetsuo; and Ohkura, Toshihiko, 4,021,817.
Ohtsuka, Kunio: *See—*
Miyauchi, Toshiyuki; and Ohtsuka, Kunio, 4,020,718.
Oida, Susumu, to Tokyo Shibaura Electric Co., Ltd. Centrifugal dehydrator. 4,021,345, Cl. 210-146.000.
Okada Kogyo Kabushiki Kaisha: *See—*
Okada, Yoshio, 4,020,550.
Okada, Takashi: *See—*
Ishigaki, Yoshio; Hongu, Masayuki; and Okada, Takashi, 4,021,749.
Okada, Toru: *See—*
Tajima, Yuzo; and Okada, Toru, 4,020,568.
Okada, Yoshio, to Okada Kogyo Kabushiki Kaisha. Cutting device. 4,020,550, Cl. 30-124.000.
Okland, Merlyn C. Vehicle running board. 4,021,055, Cl. 280-153.00R.
Olesen, Karl Richard. Stand for converting conventional bicycle for indoor exercising. 4,021,034, Cl. 272-73.000.
Olin Corporation: *See—*
Ardis, Alan E.; and Katz, Lawrence E., 4,021,261.
Godfrey, John N., 4,021,594.
Olivieri, Icaro. Lacing device for ski boots. 4,020,571, Cl. 36-50.000.
Olsson, Erik Allan. Method of and apparatus for excluding molten metal from escaping from or penetrating into openings or cavities. 4,020,890, Cl. 164-49.000.
Olympus Optical Co., Ltd.: *See—*
Hayasaka, Toshimi, 4,020,705.
Motoyama, Kazuyasu; and Kato, Toshikazu, 4,021,856.
Omata, Yasukuni: *See—*
Ozaki, Yoshihiro; Saijo, Takao; Ishii, Kenjiro; Omata, Yasukuni; and Kondo, Shoji, 4,021,108.
Onder, Besir K., to Upjohn Company, The. Alkali metal lactamate catalyst for the polymerization of diisocyanate with tetracarboxylic acid/dianhydride. 4,021,412, Cl. 260-63.00N.
Oneida Heater Company, Incorporated (Entire): *See—*
Harris, Harold F., 4,020,822.
O'Neill, John Francis; and Popper, Howard Robert, to Bell Telephone Laboratories, Incorporated. Nonlocking key telephone set. 4,021,622, Cl. 179-99.000.
O'Neill, Wilbur J. Grip for a hand held portable device. 4,020,527, Cl. 16-110.00R.
Ono Pharmaceutical Co., Ltd.: *See—*
Fujii, Setsuro; Uegai, Yoshiaki; Watanabe, Tsuyoshi; and Kayama, Naohiro, 4,021,472.
Onoda, Hajime; and Watanabe, Hiroshi, to Kimmon Manufacturing Co., Ltd. Flow meter. 4,020,689, Cl. 73-272.00R.
Onufry, Michael, Jr.: *See—*
Suyderhoud, Henri G.; Onufry, Michael, Jr.; and Kauffman, Eric R., 4,021,623.
Ookubo, Hiroyuki: *See—*
Makino, Yoshimi; and Ookubo, Hiroyuki, 4,021,728.
Oppici, Ernesto; and Gianantonio, Anacleto, to Gruppo Lepetit S.p.A. Process for preparing 6-aminopenicillanic acid, 7-aminocephalosporanic acid and its derivatives at the 3-position. 4,021,426, Cl. 260-243.00C.
O'Pray, John E.: *See—*
Channell, Ronald E.; and O'Pray, John E., 4,021,362.
O'Reilly, Kevin Joseph: *See—*
Smith, Sidney Edwin; O'Reilly, Kevin Joseph; and Prydie, John, 4,021,302.
Ormsby, Thomas R. Storage and retrieval of graphic information. 4,021,664, Cl. 250-227.000.
Orpana, Robert J., to Panatrac Manufacturing Corporation Limited. Drive sprockets for vehicle tracks. 4,021,081, Cl. 305-35.00R.
Ortho Diagnostics Inc.: *See—*
Pollack, William; and McKee, Albert, 4,021,540.

Orton, Michael Leslie: *See—*
Goulding, Terence; and Orton, Michael Leslie, 4,021,503.
Orzelek, Frank J.; and Whiting, Roy M., to Universal Instruments Corporation. Heat sealing device for component taping apparatus. 4,021,289, Cl. 156-499.000.
Osawa, Kenji: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 4,021,316.
Osawa, Kozo: *See—*
Nagare, Syoji; and Osawa, Kozo, 4,020,639.
Osberghaus, Rainer: *See—*
Moller, Hinrich; Osberghaus, Rainer; Gloxhuber, Christian; and Braig, Siegfried, 4,021,539.
O'Shaughnessy, Robert P.: *See—*
Piotrowski, Casimir F.; Scidmore, Wright H.; O'Shaughnessy, Robert P.; Marasco, Nicholas P.; Cerrato, Louis R.; and Haines, Clarence C., Jr., 4,020,739.
Ostbo, John David Bertil. Method of and arrangement for sealing the joints between the parts of a multi-part housing. 4,020,971, Cl. 220-378.000.
O'Sullivan, Thomas F.; and Korwin, Paul, to Lummus Company, The. Process to protect process heater casing from corrosion. 4,020,772, Cl. 110-56.000.
Otsuka, Masahiro: *See—*
Tomono, Makoto; Yamakawa, Goiti; Inoue, Akira; and Otsuka, Masahiro, 4,021,358.
Ott, Albert. Coulometric measuring instrument with plug adapters for making different measurements. 4,021,734, Cl. 324-94.000.
Owens-Illinois, Inc.: *See—*
Amberg, Stephen W., 4,021,285.
Amberg, Stephen W., 4,021,286.
Cuniberti, Mario, 4,020,707.
Mold, Donald F.; and Rice, Ronald G., 4,020,896.
Oyama, Mitsukazu; Tada, Yoshiro; and Sakamoto, Yasuhiko, to Fujitsu Ltd. System for regenerating a data from a burst signal which is received and processing said data with a local clock and the circuit for carrying out the same. 4,021,609, Cl. 178-69.100.
Ozaki, Yoshihiro; Saijo, Takao; Ishii, Kenjiro; Omata, Yasukuni; and Kondo, Shoji, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying apparatus. 4,021,108, Cl. 355-3.00R.
Ozasa, Teruaki: *See—*
Murakami, Masuo; Takahashi, Kozo; Ozasa, Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, 4,021,434.
Palarino, Ronald H., to Precise Metals & Plastics, Inc. Thread protector for an externally threaded pipe. 4,020,873, Cl. 138-96.00T.
Palarino, Ronald H., to Precise Metals & Plastic, Inc. Thermoplastic thread protector for internally threaded pipe. 4,020,874, Cl. 138-96.00T.
Pall Corporation: *See—*
Pall, David B., 4,021,281.
Pall, David B., to Pall Corporation. Continuous production of nonwoven tubular webs from thermoplastic fibers and products. 4,021,281, Cl. 156-167.000.
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., to Stauffer Chemical Company. Herbicide compositions. 4,021,224, Cl. 71-88.000.
Palmer, Walter E. Plant moisture indicator. 4,020,785, Cl. 116-118.00A.
Palosi, Eva: *See—*
Kisfaludy, Lajos; Rohricht, Julianna; Urogdi, Laszlo; Szeberenyi, Szabolcs; Palosi, Eva; and Szporny, Laszlo, 4,021,421.
Panabeam Corporation: *See—*
Szpur, Roman, 4,021,660.
Panatrac Manufacturing Corporation Limited: *See—*
Orpana, Robert J., 4,021,081.
Panetti, Romolo, to Frank Speno Railroad Ballast Cleaning Co., Inc.; and Frank Speno Railroad Ballast Cleaning Co. Inc. Abrading arrangement for a railway track. 4,020,599, Cl. 51-178.000.
Paolinelli, Antonio: *See—*
Piccolo, Luigi; Ghirga, Marcello; and Paolinelli, Antonio, 4,021,533.
Paradyne, Inc.: *See—*
Harris, Harvey H.; Lindberg, Victor; and Walsh, Dale M., 4,021,654.
Parke, Davis & Company: *See—*
Klapp, Steven Michael, 4,020,839.
Parry, Peter David: *See—*
Cho, Kon Ho; and Parry, Peter David, 4,021,276.
Partridge, John Joseph, Jr.: *See—*
Baggiolini, Enrico; Partridge, John Joseph, Jr.; and Uskokovic', Milan Radoje, 4,021,423.
Patel, Bahechar S., to AMF Incorporated. Protective circuit for static inverter. 4,021,719, Cl. 321-12.000.
Patko, Marton: *See—*
Pungor, Erno; Doktor, Elek; Patko, Marton; Havas, Jeno; and Kecskes, Lajos, 4,021,325.
Patlik, Alois: *See—*
Czonka, Viktor; and Patlik, Alois, 4,021,855.
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich. Plant for electroslag melting of hollow ingots shaped as non-closed cylinders. 4,020,893, Cl. 164-252.000.
Patton, John T., Jr.: *See—*
Austin, Arthur L.; Levis, William W., Jr.; and Patton, John T., Jr., 4,021,385.
Paul, Wolfgang: *See—*
Fichte, Frank; and Paul, Wolfgang, 4,021,030.
Fichte, Frank; and Paul, Wolfgang, 4,021,710.
Paulson, David S.: *See—*
Anderson, Erland D.; Paulson, David S.; and Sullivan, Bruce M., 4,020,783.
Pawlak, Joseph A.; and Bajer, Francis J., to Hooker Chemicals & Plastics Corporation. Antidegradant esters. 4,021,474, Cl. 260-485.00G.
Payne, Irene Dion: *See—*
Bondybey, Vladimir Edmund; Brus, Louis Eugene; Payne, Irene Dion; and Rentzepis, Peter Michael, 4,021,217.
Payne, James E.: *See—*
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., 4,020,821.
Peabody, Roger A.: *See—*
Oakes, Gilbert B., 4,021,056.
Peck, Wayne P., to E-Systems, Inc. Heat transfer device. 4,021,816, Cl. 343-840.000.
Pedersen, Nicholas F.; and Ellis, Gaylord O. Wind turbine. 4,021,135, Cl. 415-2.000.
Pelosi, Stanford S., Jr., to Morton-Norwich Products, Inc. 2-[5-(3,4-Dimethoxyphenyl)-2-furyl]imidazoline hydrochloride. 4,021,444, Cl. 260-309.600.
Pennings, Matheus D., to Sola Basic Industries, Inc. Two-piece capillary tip bonding tool. 4,020,543, Cl. 29-423.000.
Pepper, Kenneth V., to Genova, Inc. Sump pump assembly. 4,021,145, Cl. 417-40.000.
Per Udden AB: *See—*
Linnman, Sven N. J., 4,021,720.
Perkin-Elmer Corporation, The: *See—*
Atwood, John G.; and Demey, Charles F., II, 4,021,123.
Persak, George, Jr.: *See—*
Neidhardt, Graham B.; and Persak, George, Jr., 4,021,213.
Petersen, Erling Niels: *See—*
Hernestam, Sven Eric Harry; and Petersen, Erling Niels, 4,021,563.
Petersen, Harro: *See—*
Eisele, Wolfgang; Petersen, Harro; Mayer, Johann; and Wittmann, Otto, 4,021,413.
Petersen, Robert, to United States of America, Navy. Automatic increment sizer-feeder for press loading. 4,020,736, Cl. 86-20.00B.
Peterson, Carl R.; and Fisk, Allan T., to Rapidex, Inc. Sealing between relatively rotating members in boring apparatus. 4,020,910, Cl. 175-345.000.
Peterson, Dean M., to Honeywell Inc. Automatic focus control motive means. 4,021,821, Cl. 354-25.000.
Peterson, Harry W., to Fairchild Camera and Instrument Corporation. Memory cell circuit and semiconductor structure therefore. 4,021,786, Cl. 340-173.0FF.
Peterson, John O. H., to Scott Paper Company. Laser imaging a lanographic printing plate. 4,020,762, Cl. 101-467.000.
Peti Nitrogenmuvek: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Sipos, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.
Petro-Electric Motors, Ltd.: *See—*
Rosen, Charles; and Wouk, Victor, 4,021,677.
Petro, Jozsef; Mathe, Tibor; and Tungler, Antal, to Budapesti Muszaki Egyetem. Process for the preparation of metal oxide catalysts and metal oxide supported catalysts. 4,021,371, Cl. 252-454.000.
Petro, Jozsef; Mathe, Tibor; Tungler, Antal; and Csuros, Zoltan, to Magyar Tudomanyos Akademia Szerves Kemiai Technologiai Tanszek. Selective hydrogenating catalysts and a process for the preparation thereof. 4,021,374, Cl. 252-473.000.
Petrov, Kuart Mikhailovich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.
Pettersson, Kurt: *See—*
Glanvall, Rune; Kalen, Hans; and Pettersson, Kurt, 4,021,166.
Petukhov, Ivan Nikolaevich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.
Pevrick Engineering Co., Inc.: *See—*
Hedrick, John R., 4,020,555.
Pfaudler-werke AG: *See—*
Ehret, Rudolf; and Hoyer, Gerhard, 4,021,707.
Pfeifer, Josef; Rheude, Alfred; Thate, Kurt; and Muller, Jurgen, to

AGFA-Gevaert, A.G. Ionography imaging chamber. 4,021,668, Cl. 250-315.00A.
Pfister, William J.: *See—*
Shirn, George A.; and Pfister, William J., 4,021,277.
Pharmaco, Inc. (Entire): *See—*
Larson, Roger R., 4,020,837.
Phelps, Elmer B.; and Friede, Allen J., to Caterpillar Tractor Co. Adjustable lip type seal for a crankshaft. 4,021,049, Cl. 277-11.000.
Phelps, Robert H. Hair curler having integral retainer. 4,020,855, Cl. 132-40.000.
Philagro: *See—*
Lacroix, Guy; and Debourge, Jean-Claude, 4,021,549.
Phillips, Ian Ross; and Reynolds, Mervyn Frank, to N.J. Phillips Pty. Limited. Animal dosing syringe. 4,020,838, Cl. 128-223.000.
Phillips Petroleum Company: *See—*
Bailey, Fay W., 4,021,596.
Carter, Cecil O., 4,021,312.
Fozzard, George B.; and Norell, John R., 4,021,465.
Hudson, Paul S., 4,021,490.
Rogers, Ronald S., 4,021,500.
Vautrain, Lucien H.; and Ems, Herbert A., 4,021,201.
Photon Power, Inc.: *See—*
Jordan, John Francis, 4,020,792.
Piazza, Anthony F. Golf ball retrievers. 4,021,068, Cl. 294-19.00A.
Piccolo, Luigi; Ghirga, Marcello; and Paolinelli, Antonio, to Societa' Italiana Resine S.I.R. S.p.A. Manufacture of titanium dioxide by the sulphate process using nuclei formed by steam hydrolysis of $TiCl_4$. 4,021,533, Cl. 423-610.000.
Picture Doll Company: *See—*
Benner, Dorothy, 4,020,586.
Pioker, Gyula: *See—*
Fleischer, Bertalan; Gaal, Otto; Lengyel, Sandor; and Pioker, Gyula, 4,020,534.
Piotrowski, Casimir F.; Scidmore, Wright H.; O'Shaughnessy, Robert P.; Marasco, Nicholas P.; Cerrato, Louis R.; and Haines, Clarence C., Jr., to United States of America, Army. Fire control system. 4,020,739, Cl. 89-41.0ME.
Pira, Francois Jean; and Van Wijk, Jozef Carolus, to AGFA-GEVAERT N.V. Apparatus for the edges of thermoplastic web. 4,021,179, Cl. 425-369.000.
Pisio, Peter; and Kirkvold, Charles F., to Chevron Research Company. Arrangement for recovering viscous petroleum from thick tar sand. 4,020,901, Cl. 166-50.000.
Pitney-Bowes, Inc.: *See—*
Irvine, Robert; and Luperti, Harry E., 4,020,615.
Pittatore, Angiolina. Motor-compressor unit of the sealed type for refrigerating appliances. 4,020,645, Cl. 62-474.000.
Pittinger, Charles B.: *See—*
Pittinger, Cynthia Ann, 4,020,553.
Pittinger, Cynthia Ann, to Pittinger, Charles B. Filament vegetation trimmer with basket woven automatic feed means and method. 4,020,553, Cl. 30-347.000.
Plank, Charles J.; Rosinski, Edward J.; and Givens, Edwin N., to Mobil Oil Corporation. Converting low molecular weight olefins over zeolites. 4,021,502, Cl. 260-683.15R.
Plank, Charles J.: *See—*
Rubin, Mae K.; Plank, Charles J.; and Rosinski, Edward J., 4,021,447.
Plastic & Form Kunststoff-Verarbeitungs-GmbH: *See—*
Prinz, Erich, 4,021,172.
Plat born Berry, Monique: *See—*
Plat, Michel Marie Rene; and Plat born Berry, Monique, 4,021,430.
Plat, Michel Marie Rene; and Plat born Berry, Monique, to Synthelabo. Dihydroapovincaminic acid amines. 4,021,430, Cl. 260-293.530.
Plummer, William T.: *See—*
McCann, John J.; McCann, Mary A.; Plummer, William T.; Seiden, Myron A.; and Walworth, Vivian K., 4,021,825.
Podowski, Robert R.; and Citta, Richard W., to Zenith Radio Corporation. Electric remote control transmitter. 4,021,756, Cl. 331-117.00R.
Pohl, Herbert Adolf, to Western Electric Company, Inc. Forming and stripping of conductors. 4,020,548, Cl. 29-630.00R.
Polaroid Corporation: *See—*
Grasshoff, J. Michael, 4,021,417.
Locatell, Louis, Jr., 4,021,416.
McCann, John J.; McCann, Mary A.; Plummer, William T.; Seiden, Myron A.; and Walworth, Vivian K., 4,021,825.
Young, Richard W., 4,021,241.
Polimadei, Roland A.: *See—*
Epstein, Arnold S.; Share, Stewart; and Polimadei, Roland A., 4,021,834.
Politechnika Karkowska: *See—*
Jarnuszkiewicz, Stanislaw, 4,020,801.
Polito, Alan J., to Beckman Instruments, Inc. Reagents used in the radioimmunoassay of digoxin. 4,021,535, Cl. 424-1.000.
Pollack, William; and McKee, Albert, to Ortho Diagnostics Inc. Preparation of a hepatitis B immune globulin and use thereof as a prophylactic material. 4,021,540, Cl. 424-86.000.
Pollner, Rudolf; Friese, Karl-Hermann; Topp, Bernhard; and Neidhard, Horst, to Robert Bosch G.m.b.H. Electro-chemical sensor. 4,021,326, Cl. 204-195.00S.
Poncha, Rustom P., to Allied Chemical Corporation. Trona calcination. 4,021,525, Cl. 423-184.000.
Poncha, Rustom P.: *See—*
Gancy, Alan B.; and Poncha, Rustom P., 4,021,526.
Poncy, George W., Jr.: *See—*
Poncy, Richard P.; Poncy, Mark P.; Poncy, George W., Sr.; Poncy, George W., Jr.; and Brandriff, Robert C., 4,020,841.
Poncy, George W., Sr.: *See—*
Poncy, Richard P.; Poncy, Mark P.; Poncy, George W., Sr.; Poncy, George W., Jr.; and Brandriff, Robert C., 4,020,841.
Poncy, Mark P.: *See—*
Poncy, Richard P.; Poncy, Mark P.; Poncy, George W., Sr.; Poncy, George W., Jr.; and Brandriff, Robert C., 4,020,841.
Poncy, Richard P.; Poncy, Mark P.; Poncy, George W., Sr.; Poncy, George W., Jr.; and Brandriff, Robert C. Catamenial tampon. 4,020,841, Cl. 128-285.000.
Pont-A-Mousson S.A.: *See—*
Maeder, Claude; and Sutter, Jean Georges, 4,021,015.
Popper, Howard Robert: *See—*
O'Neill, John Francis; and Popper, Howard Robert, 4,021,622.
Porta-Test Manufacturing Ltd.: *See—*
Swann, Ferris George; and Beckmann, Martin Josef, 4,021,189.
Porter, James T., to Leigh Products, Inc. Surface bolt. 4,021,063, Cl. 292-67.000.
Porter, Wilbur A.: *See—*
Kilby, Jack S.; Lathrop, Jay W.; and Porter, Wilbur A., 4,021,323.
Portlandzementwerk Dotternhausen Rudolf Rohrbach KG: *See—*
Weislehner, Gustav, 4,021,194.
Portus, Robert Terence: *See—*
Van Millingen, Reuel Duncan; and Portus, Robert Terence, 4,020,685.
Post Office, The: *See—*
Potter, Arthur Robin; and Smith, Donald William, 4,021,619.
Post, William C.: *See—*
Baker, Donald H.; Bowe, Larry J.; Manning, Kenzel P.; and Post, William C., 4,021,009.
Poteat, George A., to Engineered Plastics, Incorporated. Spool assembly. 4,021,004, Cl. 242-118.600.
Potter, Arthur Robin; and Smith, Donald William, to Post Office, The. Improved digital telephone and switching system employing time division multiplex pulse code modulation. 4,021,619, Cl. 179-18.0FC.
Powers, Harold C., to Caterpillar Tractor Co. Air bearing seal with bellows mounting means. 4,021,050, Cl. 277-75.000.
Pozniko, John M.: *See—*
Deeter, Ronald C.; Lora, Thad A.; and Pozniko, John M., 4,021,126.
PPG Industries, Inc.: *See—*
Drummond, Warren W., 4,020,623.
Pram, Inc.: *See—*
Banker, Harold J., 4,021,587.
Pratt, John William. Street lighting columns. 4,020,606, Cl. 52-116.000.
Precise Metals & Plastic, Inc.: *See—*
Palarino, Ronald H., 4,020,874.
Precise Metals & Plastics, Inc.: *See—*
Palarino, Ronald H., 4,020,873.
Precision Mfg. Inc. - Fabrication: *See—*
Legler, George; Hostettler, Hans; Lacoste, Jean-Pierre; and Schwab, Friedrich, 4,020,604.
Prepost, Kalman: *See—*
Toth, Istvan; and Prepost, Kalman, 4,020,716.
President and Fellows of Harvard College: *See—*
Goetzl, Edward J.; and Austen, K. Frank, 4,021,387.
Preugschas, Helmut; Daubach, Ewald; Fischer, Roman; and Herrmann, Manfred, to BASF Aktiengesellschaft. Herbicides. 4,021,226, Cl. 71-92.000.
Priestley, Robert Joseph, to Dorr-Oliver Incorporated. Dilute phase waste incinerator. 4,021,184, Cl. 431-7.000.
Prikhodko, Valery Alexandrovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.
Pringle, William L., to United States Steel Corporation. Bed assembly. 4,020,512, Cl. 5-264.00R.
Pringle, William L., to United States Steel Corporation. Dual truck wheel assembly having an elliptical locking cam plate. 4,021,077, Cl. 301-13.0SM.
Prinz, Erich, to Plastic & Form Kunststoff-Verarbeitungs-GmbH. Extrusion apparatus for foil-covered, hollow plastic bodies. 4,021,172, Cl. 425-113.000.
Probe Engineering Company Limited: *See—*
Green, Brian John; and Lees-Smith, Bernard Ivor, 4,021,733.
Prochazka, Hubert: *See—*
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, 4,021,368.
Prutkovsky, Samuil Alexandrovich: *See—*
Dukshtau, Alexandr Antonovich; Prutkovsky, Samuil Alexandrovich; Detinko, Felix Moiseevich; Golubentsev, Jury Sergeevich; and Lurie, Alexandr Nesanelevich, 4,021,691.
Prydie, John: *See—*
Smith, Sidney Edwin; O'Reilly, Kevin Joseph; and Prydie, John, 4,021,302.
Pundsack, Arnold L., to Xerox Corporation. Photocopying camera and processing device. 4,021,110, Cl. 355-10.000.
Pungor, Erno; Doktor, Elek; Patko, Marton; Havas, Jeno; and Kecskes,

Lajos, to Elektrokemiai Muszergyarto Szov. Selective fluoride-sensitive electrode. 4,021,325, Cl. 204-195.00M.
Pungor, Erno: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Siposs, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.
Purrer, Josef, to Maschinenfabrik Fahr Aktiengesellschaft. Drive system for chopping apparatus. 4,020,995, Cl. 241-101.200.
Puschmann, Sigfrid: *See—*
Schmidt, Gunther; Engelhardt, Gunther; and Puschmann, Sigfrid, 4,021,557.
Q-Dot Corporation: *See—*
Grover, George M., 4,020,898.
Qonaar Corporation: *See—*
Collins, Terence J., 4,020,927.
Quaglino, Carl A.: *See—*
Cook, Thomas W.; and Quaglino, Carl A., 4,021,772.
Quaif, Richard S.; and Hays, John D., to NCR Corporation. Matrix print head repetition rate control. 4,020,939, Cl. 197-1.00R.
Quinlan, Albert J. Rotary cutting die. 4,020,724, Cl. 83-346.000.
R. J. Reynolds Tobacco Company: *See—*
Baker, Max Norris, 4,020,852.
Raacke, Karl Heinz: *See—*
Hood, Roderick Kermit; and Raacke, Karl Heinz, 4,021,278.
Rabenhorst, David W., to Johns Hopkins University, The. Filament connected rim rotor. 4,020,714, Cl. 74-572.000.
Radstake, Herman; De Jong, Gerrit; and van der Velden, Josephus Hendrikus Maria, to Hoogovens Ijmuiden B.V. Automatic coke oven plant with means to insure sufficient coking. 4,021,309, Cl. 202-227.000.
Raines, Kenneth; and Burke, George K., to Burron Medical Products, Inc. Flat profile filter. 4,021,353, Cl. 210-448.000.
Raisin, Jean-Pierre; and Helffer, Bernard, to Centre Technique Industriel dit: Institut Textile de France. Device for detecting defects in needles on a knitting loom which is in operation. 4,020,655, Cl. 66-157.000.
Raizon, Bernard Michel: *See—*
Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, 4,021,567.
Rajsigl, Zdenek, to ZVL Vyzkumny ustav pro valiva loziska. Antifriction bearing arrangement for a high speed rotary machine part. 4,021,086, Cl. 308-189.00R.
Rakowsky, Frederick W.: *See—*
Meguerian, Garbis H.; and Rakowsky, Frederick W., 4,021,372.
Ramsch, Gerhard: *See—*
Schloesser, Andreas; and Ramsch, Gerhard, 4,020,851.
Randell, Donald Richard: *See—*
Holt, Brian; and Randell, Donald Richard, 4,021,432.
Rankowitz, Marshall Miles, to General Foods Corporation. Process for fibered meat analogs. 4,021,584, Cl. 426-242.000.
Ranson, Charles R. Cartridge loading machine. 4,020,737, Cl. 86-23.000.
Rapata, George M.: *See—*
Koscik, Richard A.; and Rapata, George M., 4,020,970.
Rapidex, Inc.: *See—*
Peterson, Carl R.; and Fisk, Allan T., 4,020,910.
Rasmussen, Robert. Replacement grouser bar and method for manufacturing the same. 4,021,082, Cl. 305-54.000.
Rawcliffe, John; and Vassie, John McLauchlan, to Elliott Brothers (London) Limited. Apparatus for use in determining a characteristic of a cathode ray tube. 4,021,724, Cl. 324-20.0CR.
Rawlings, Eugene. Roofer's staging. 4,020,921, Cl. 182-45.000.
Raymond, Ernest R. Adjustable stop device. 4,020,742, Cl. 90-11.00E.
Raymond International Inc.: *See—*
Swenson, William J., 4,020,744.
Raymond, Joseph H., Jr.: *See—*
Caudel, Edward R.; and Raymond, Joseph H., Jr., 4,021,656.
Raymond Lee Organization, Inc., The: *See—*
Dodson, Stanton A., 4,020,824.
Duncan, James E., 4,020,595.
Hatje, Carl H. J., 4,020,733.
Luck, Oral W., 4,020,907.
Morgan, Leo J., 4,020,508.
Noble, Roy A., 4,020,916.
Warren, McCoy; and Warren, Alfreda C., 4,020,513.
Wells, Leslie H., 4,020,906.
Wiersma, Alva J., 4,021,013.
Raymond, Leonard; Bockelmann, John B.; and Tirado, William, Jr., to F. & M. Schaefer Brewing Company, The. Preparation of an alcoholic malt beverage base. 4,021,580, Cl. 426-16.000.
Raytheon Company: *See—*
Baum, Peter N.; and Mitchell, Michael J., 4,021,739.
Richmond, Martin R.; and Hutchins, William R., 4,021,803.
RCA Corporation: *See—*
Chase, Thomas Louis; Duranti, Dino; and Sassoli, Renato, 4,021,820.
Crowle, Brian, 4,021,722.
Denlinger, Edgar Jacob, 4,021,839.
Ho, Panb-Ting; and Rosen, Arye, 4,021,750.
Hurst, Robert Norman; and Dischert, Robert Adams, 4,021,852.
James, Emrys Craig; and Fairfax, Gerald Henry, 4,021,615.
Jones, Charlie Luther; and Schulte, William Lester, Jr., 4,021,620.
Moore, Robert Milton, 4,021,375.
Nossen, Edward Joachim, 4,021,757.
Royce, Martin Robert; and Thompson, Robert Paul, 4,021,588.
Stockdale, George Fairbank; and Cooper, John Leslie, 4,021,219.
Zuk, Borys, 4,021,686.
Reagan, Donald William: *See—*
Mishcon, Lester; and Reagan, Donald William, 4,020,653.
Redding, James A.: *See—*
Wilmot, George L.; and Redding, James A., 4,020,629.
Redfield, William: *See—*
Mahon, Joseph J.; Redfield, William; and Supel, Ignacy, 4,020,625.
Redicon Corporation: *See—*
Bulso, Joseph D., Jr.; and Hipple, Robert T., deceased, 4,020,670.
Reed Irrigation Systems, Inc.: *See—*
Zimmerman, Harry M., 4,021,061.
Regie Nationale des Usines Renault: *See—*
Malphettes, Jean; and Fontanet, Pierre, 4,020,859.
Reichhold Chemicals, Inc.: *See—*
Kirkpatrick, Harold B.; Distler, Edward C.; and Menzin, Marvin, 4,020,832.
Reid, Edward A., Jr.; Myler, George W.; and Payne, James E., to Columbia Gas System Service Corporation. Gas-fired smooth top range. 4,020,821, Cl. 126-39.00E.
Reiner, Per Lennart, to A. Ahlstrom Osakeyhtio. Method and device for manufacturing a continuous material web of elongated fibrous particles. 4,021,296, Cl. 162-214.000.
Reinhold, Huibert Peter: *See—*
van den Heuvel, Eeuwoud; and Reinhold, Huibert Peter, 4,020,759.
Reliance Electric Company: *See—*
Highberger, Gary G., 4,021,783.
Remy, David C.; and Britcher, Susan F., to Merck & Co., Inc. Trifluoromethylthio- and trifluoromethylsulfonyl-thioxanthen-9-ylidenepiperidines. 4,021,561, Cl. 424-267.000.
Rendemonti, Louis Frank. Apparatus and method for pressure cleaning and waxing automobiles and the like. 4,020,857, Cl. 134-7.000.
Rennicke, Klaus: *See—*
Von Hacht, Reinhard; Rennicke, Klaus; and Schmedemann, Walter, 4,021,715.
Renth, Ernst-Otto: *See—*
Schromm, Kurt; Mentrup, Anton; Renth, Ernst-Otto; and Traunecker, Werner, 4,021,485.
Rentzepis, Peter Michael: *See—*
Bondybey, Vladimir Edmund; Brus, Louis Eugene; Payne, Irene Dion; and Rentzepis, Peter Michael, 4,021,217.
Resch, Heinz, to Gebrueder Buehler AG. Actuation apparatus for the movable mold halves or parts of an injection molding machine or the like. 4,021,182, Cl. 425-451.600.
Research Corporation: *See—*
Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, 4,021,457.
Research Lab Products, Inc.: *See—*
Saurino, Vincent R., 4,021,537.
Reshetova, Galina Vasilievna: *See—*
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.
Reuschel, Konrad; Keller, Wolfgang; Kersting, Arno; and Emeis, Reimer, to Siemens Aktiengesellschaft. Apparatus for indiffusing dopants into semiconductor material. 4,020,791, Cl. 118-49.100.
Rexnord Inc.: *See—*
Callies, Fritz A., 4,020,651.
Reynolds, Frank L.; and Langer, Alfred C. Fastener. 4,020,613, Cl. 52-321.000.
Reynolds, Lionel Arthur, to A. F. Hydraulics Limited. Hydraulically-operated devices. 4,020,747, Cl. 91-298.000.
Reynolds, Mervyn Frank: *See—*
Phillips, Ian Ross; and Reynolds, Mervyn Frank, 4,020,838.
Reynolds Metals Company: *See—*
Ferguson, Jack A.; and Korn, Clarence D., 4,021,192.
Rice, Richard M., 4,021,523.
Rheude, Alfred: *See—*
Pfeifer, Josef; Rheude, Alfred; Thate, Kurt; and Muller, Jurgen, 4,021,668.
Rhodes, John R.: *See—*
Clausen, Kermit D.; and Rhodes, John R., 4,021,667.
Rhodes, Melvin H., to Rockwell International Corporation. Angular rate deriving apparatus. 4,021,658, Cl. 235-183.000.
Rhone-Poulenc Industries: *See—*
Benois, Jean-Claude, 4,021,220.
Cotrel, Claude; Jeanmart, Claude; and Barreau, Michel, 4,021,554.
Rice, George A., to Work Wear Corporation. Shade marking machine. 4,021,029, Cl. 270-31.000.
Rice, Howard Gene: *See—*
Kitterman, Lawrence Pete; and Rice, Howard Gene, 4,021,266.
Rice, Richard M., to Reynolds Metals Company. Method of extruding plastic film. 4,021,523, Cl. 264-209.000.
Rice, Robert D.: *See—*
Gloviak, John A.; and Rice, Robert D., 4,020,706.
Rice, Ronald G.: *See—*
Mold, Donald F.; and Rice, Ronald G., 4,020,896.
Rich, Edward L. Ski lock apparatus. 4,020,661, Cl. 70-58.000.
Richard Wolf GmbH: *See—*
Barsom, Shafik, 4,020,840.

Richman, Edward B.; Tomlinson, Seymour W.; Nemeth, Suzette; and Wilson, David W., to Avery International Corporation. Linerless, reclosable tab stock. 4,020,842, Cl. 128-287.000.

Richmond, Martin R.; and Hutchins, William R., to Raytheon Company. Proximity sensing apparatus. 4,021,803, Cl. 343-7.0PF.

Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
Kisfaludy, Lajos; Rohricht, Julianna; Urogdi, Laszlo; Szeberenyi, Szabolcs; Palosi, Eva; and Szporny, Laszlo, 4,021,421.

Ricoh Co., Ltd.: *See—*
Kuroishi, Shoji; and Mochizuki, Manabu, 4,021,111.

Rieter Machine Works, Ltd.: *See—*
Lattion, Andre, 4,020,622.
Schar, Hugo, 4,020,997.

Rigollot, Georges Alfred. Method of working a combined nuclear-fossil fuel cycle and device for using same. 4,021,299, Cl. 176-39.000.

Rimmrott, Manfred, to Siemens Aktiengesellschaft. Arrangement for detecting deficient operational capability of vacuum switching vessels. 4,021,702, Cl. 361-103.000.

Rind, Harold. Oxygen source for human respiration requirements. 4,020,833, Cl. 128-142.00R.

Rinde, James A.; and Fulton, Fred J., to United States of America, Energy Research and Development Administration. Method of making foam-encapsulated laser targets. 4,021,280, Cl. 156-80.000.

Ritter, Gerhard: *See—*
Gott, Hans; and Ritter, Josef, 4,020,669.
Gott, Hans; Ritter, Josef; Ritter, Klaus; Ritter, Gerhard; Zechner, Gottfreid; and Schmidt, Gerhard, 4,021,634.

Ritter, Josef: *See—*
Gott, Hans; and Ritter, Josef, 4,020,669.
Gott, Hans; Ritter, Josef; Ritter, Klaus; Ritter, Gerhard; Zechner, Gottfreid; and Schmidt, Gerhard, 4,021,634.

Ritter, Klaus: *See—*
Gott, Hans; and Ritter, Josef, 4,020,669.
Gott, Hans; Ritter, Josef; Ritter, Klaus; Ritter, Gerhard; Zechner, Gottfreid; and Schmidt, Gerhard, 4,021,634.

Roachsmith, Humphrey, to Westinghouse Brake & Signal Company Limited. Fail-safe transformer circuit. 4,021,723, Cl. 323-50.000.

Robert Bosch G.m.b.H.: *See—*
Pollner, Rudolf; Friese, Karl-Hermann; Topp, Bernhard; and Neidhard, Horst, 4,021,326.
Schacht, Hans; Bauer, Eberhard; Wurth, Walter; Schleicher, Karl; and Soyer, Wolfgang, 4,021,342.

Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, to Thomas J. Lipton, Inc. Ice confection. 4,020,643, Cl. 62-322.000.

Roberts, Sidney G., to Kaiser Aluminum & Chemical Corporation. Ultrafine grain Al-Mg alloy product. 4,021,271, Cl. 148-2.000.

Robertshaw Controls Company: *See—*
Baltrush, John J., 4,021,689.
Fabish, Donald C., 4,020,863.
Hild, Henry F.; and Manecke, Siegfried E., 4,021,094.
Smith, Eugene G., 4,021,268.

Robin, Allen M.; and Child, Edward T., to Texaco Inc. Production of hydrogen-rich gas. 4,021,366, Cl. 252-373.000.

Robinson, Anthony J.: *See—*
Frazerhurst, Lyndon F.; Robinson, Anthony J.; and Macfarlane, Peter G., 4,020,993.

Robinson, Dan L.: *See—*
Welty, Richard K.; Robinson, Dan L.; and Deveraux, Harry R., 4,020,673.

Robinson, John William; and Doane, Patrick King, to Kimball International, Inc. Electronic organ with automatic keying of pedal notes. 4,020,728, Cl. 84-1.030.

Robison, Wayne B., to Lawrence Peska Associates, Inc., a part interest. Stationary back scrubber. 4,020,519, Cl. 15-104.920.

Roccaforte, Harry I., to Hoerner Waldorf Corporation. Carton suspension. 4,020,947, Cl. 206-45.310.

Rockett, Thomas J.; Tiffany, John S.; and O'Connell, John J., to American Hospital Supply Corporation. Composite for dental restorations. 4,020,557, Cl. 32-15.000.

Rockwell-Golde, GmbH: *See—*
Salomon, Horst; and Kouth, Herbert, 4,020,593.

Rockwell International Corporation: *See—*
Dickson, Fred D., 4,021,190.
Rhodes, Melvin H., 4,021,658.
Vrolyk, John J., 4,020,696.

Roden, William A.: *See—*
Ellsworth, Archibald B.; Mayberry, Douglas W.; Roden, William A.; and Roye, Cleveland E., 4,021,840.

Roese, John A., to United States of America, Navy. Liquid crystal stereoscopic viewer. 4,021,846, Cl. 358-92.000.

Rogers, Melvin F., to Zenith Radio Corporation. Color television picture tubes with improved implosion protection system. 4,021,850, Cl. 358-245.000.

Rogers, Ronald S., to Phillips Petroleum Company. Oxidative dehydrogenation system. 4,021,500, Cl. 260-680.00E.

Rohr, Wolfgang: *See—*
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,021,222.

Rohricht, Julianna: *See—*
Kisfaludy, Lajos; Rohricht, Julianna; Urogdi, Laszlo; Szeberenyi, Szabolcs; Palosi, Eva; and Szporny, Laszlo, 4,021,421.

Rolschikov, Leonid Dmitrievich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.

Roney, John E., to Jones & Laughlin Steel Corporation. Method and apparatus for measurement of surface temperature. 4,020,695, Cl. 73-355.0EM.

Rosen, Arye: *See—*
Ho, Panb-Ting; and Rosen, Arye, 4,021,750.

Rosen, Charles; and Wouk, Victor, to Petro-Electric Motors, Ltd. Hybrid power system. 4,021,677, Cl. 290-40.00R.

Rosenblum, Marc, to Johnson & Johnson. Polishing compositions. 4,021,263, Cl. 106-288.00B.

Rosenbush, Fred M.; and Telakowski, Robert, to United Technologies Corporation. Dual combined cycle air-conditioning system. 4,021,215, Cl. 62-402.000.

Rosinski, Edward J.: *See—*
Plank, Charles J.; Rosinski, Edward J.; and Givens, Edwin N., 4,021,502.
Rubin, Mae K.; Plank, Charles J.; and Rosinski, Edward J., 4,021,447.

Rossler, Frederick William, Jr.: *See—*
Dola, Frank Peter; and Rossler, Frederick William, Jr., 4,021,604.

Rossmann, Siegfried: *See—*
Steinle, Gerhart; and Rossmann, Siegfried, 4,020,624.

Rowatt, Robert J.: *See—*
Kochhar, Rajindar K.; and Rowatt, Robert J., 4,021,599.

Royce, Martin Robert; and Thompson, Robert Paul, to RCA Corporation. Method for preparing filter-coated phosphor particles. 4,021,588, Cl. 427-215.000.

Roye, Cleveland E.: *See—*
Ellsworth, Archibald B.; Mayberry, Douglas W.; Roden, William A.; and Roye, Cleveland E., 4,021,840.

Rubin, Isaac D.: *See—*
Morduchowitz, Abraham; Jordan, Terence B.; and Rubin, Isaac D., 4,021,357.

Rubin, Mae K.; Plank, Charles J.; and Rosinski, Edward J., to Mobil Oil Corporation. Synthesis of zeolite ZSM-4. 4,021,447, Cl. 260-326.800.

Rubino, Andrew M., to Armour Pharmaceutical Company. Magnesium-zirconium complexes useful as antiperspirants. 4,021,536, Cl. 424-47.000.

Rubino, Andrew M.: *See—*
Gilman, William S.; Jones, John L.; and Rubino, Andrew M., 4,021,398.

Ruble, Frank D., to Xerox Corporation. Velocity command signal generating apparatus. 4,021,650, Cl. 235-151.110.

Ruckert, Hans: *See—*
Steppan, Hartmut; and Ruckert, Hans, 4,021,243.

Rue, Arthur K., to Hughes Aircraft Company. Reactionless gimbal drive system. 4,021,716, Cl. 318-648.000.

Ruegg, Rudolf: *See—*
Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, 4,021,574.

Rufer, Clemens: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.

Runtsch, Erhard, to Brown, Boveri & Cie. A.G. Device for limiting currents. 4,021,699, Cl. 361-11.000.

Rush-Hampton, Inc.: *See—*
Harich, Jakob; and Harich, Franz P., 4,021,548.
Harich, Jakob; and Harich, Franz P., 4,021,577.
Harich, Jakob; and Harich, Franz P., 4,021,578.

Russell, Birdsall & Ward, Inc.: *See—*
Chadwick, Donald H., 4,021,274.

Russell, Donald Henry: *See—*
Frisch, Kurt Charles; and Russell, Donald Henry, 4,021,378.

Rutenberg, Alexander; and Zur, Alexander, to TMB Industrial Maintenance Ltd. Fluid driven reciprocating pump. 4,021,149, Cl. 417-395.000.

Ryan, John W.; and Moore, James D. Bicycle braking system. 4,020,925, Cl. 188-24.000.

Rylewski, Eugeniusz M. Rotative machine for fluids with spiral-like passages and vane wheels. 4,021,165, Cl. 418-111.000.

Ryo-Nichi Co., Ltd.: *See—*
Nakanishi, Kakusaburo; Yoshida, Tatsuro; and Nakatubo, Kyoku, 4,021,508.

Ryser, Gottlieb: *See—*
Bollag, Werner; Ruegg, Rudolf; and Ryser, Gottlieb, 4,021,574.

Sabino, Frank, Jr., to Westinghouse Electric Corporation. Centrifugal pump. 4,021,136, Cl. 415-111.000.

Safford, Frederick B., to Agbabian Associates. Mechanical force pulse generator for use in structural analysis. 4,020,672, Cl. 73-12.000.

Sage, Paul, to Verdol S.A. Apparatus for making loop pile fabric. 4,020,774, Cl. 112-79.00A.

Saijo, Takao: *See—*
Ozaki, Yoshihiro; Saijo, Takao; Ishii, Kenjiro; Omata, Yasukuni; and Kondo, Shoji, 4,021,108.

St. John, Richard C., to Aspro, Incorporated. Centrifugal clutch with centrifugal detent. 4,020,936, Cl. 192-105.0BA.

Saipem S.p.A.: *See—*
Scodino, Amborgio, 4,020,952.

Saito, Shoichi. Miniature cassette tape recorder. 4,021,854, Cl. 360-62.000.

Sakagami, Teruo: *See*—
Murayama, Naohiro; Katto, Takayuki; Iizuka, Yo; and Sakagami, Teruo, 4,021,509.
Sakai, Naomi: *See*—
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 4,021,316.
Sakai, Toshimitsu: *See*—
Ishihara, Tomoo; Sakai, Toshimitsu; and Yamada, Yasufumi, 4,021,712.
Sakamoto, Yasuhiko: *See*—
Oyama, Mitsukazu; Tada, Yoshiro; and Sakamoto, Yasuhiko, 4,021,609.
Sakata, Kunihiro, to Hitachi, Ltd. Function generator and application thereof. 4,021,648, Cl. 235-150.530.
Salem Tool Company, The: *See*—
Deeter, Ronald C.; Lora, Thad A.; and Pozniko, John M., 4,021,126.
Salomon, Horst; and Kouth, Herbert, to Rockwell-Golde, GmbH. Window winding apparatus for vertically divided automobile sliding window panes. 4,020,593, Cl. 49-103.000.
Samoilovich, Mikhail Isaakovich: *See*—
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.
Samuels, W. Edward; and Adler, Robert J. Cryogenic liquid level measuring apparatus and probe therefor. 4,020,690, Cl. 73-299.000.
Sanders Associates, Inc.: *See*—
Bourgeois, Armand E., 4,020,514.
Brodeur, Lester R., 4,021,608.
Colao, Angelo A., 4,021,754.
Sanders, Raymond J., to British Columbia Research Council. Heave compensating cranes. 4,021,019, Cl. 254-172.000.
Sando Iron Works Co., Ltd.: *See*—
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,020,657.
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, to Sando Iron Works Co., Ltd. Pressure seal apparatus for a high pressure steamer. 4,020,657, Cl. 68-5.00E.
Sandoz, Inc.: *See*—
Linder, Jerome; and Houlihan, William J., 4,021,492.
Sandoz Ltd.: *See*—
Carbonell, Jose; Hasler, Rolf; and Walliser, Roland, 4,020,998.
Mayerhoefer, Horst; Mueller, Wolfgang; and Sollberger, Urs, 4,021,464.
Sangar, Vijay K.: *See*—
Muir, Robert D.; and Sangar, Vijay K., 4,021,305.
Sansui Electric Co., Ltd.: *See*—
Takahashi, Susumu, 4,021,612.
Santen Pharmaceutical Co. Ltd.: *See*—
Fujita, Tadashi; Chiba, Takehisa; and Horiuchi, Masato, 4,021,198.
Sapir, Said, to International Telephone and Telegraph Corporation. Anti-skid brake control system and components thereof. 4,021,080, Cl. 303-92.000.
Saracsan, Jeffrey W., to Goodyear Tire & Rubber Company, The. Sulfuric acid-resistant polyurethane composition and method of preparation. 4,021,414, Cl. 260-77.5AM.
Sarmac S.A.: *See*—
Moyse, Bernard, 4,020,766.
Sarstedt, Walter, to Kunststoff-Spritzgusswerk. Vessels for the optical observation of liquids. 4,021,124, Cl. 356-246.000.
Sarstedt, Walter, to Walter Sarstedt Kunststoff-Spritzgusswerk. Filter device for separating blood fractions. 4,021,352, Cl. 210-359.000.
Sartore, James J. A. Securable multi-purpose clamp and inserts. 4,020,530, Cl. 24-252.00R.
Sasabe, Haruyoshi: *See*—
Naruishi, Tadayuki; Kataoka, Youichi; Sasabe, Haruyoshi; and Tutiya, Satoru, 4,021,598.
Sashihara, Kenji; Masuda, Takao; Yamashita, Hiroshi; and Noguchi, Yasuhiro, to Fuji Photo Film Co., Ltd. Thermally developable photosensitive material. 4,021,250, Cl. 96-114.100.
Sashihara, Kenji: *See*—
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,021,249.
Sasse, Klaus: *See*—
Naumann, Klaus; Lurssen, Klaus; and Sasse, Klaus, 4,021,221.
Sassoli, Renato: *See*—
Chase, Thomas Louis; Duranti, Dino; and Sassoli, Renato, 4,021,820.
Satchell, Donald P., Jr., to Continental Oil Company. Hydrotreating a high sulfur, aromatic liquid hydrocarbon. 4,021,330, Cl. 208-89.000.
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsions. 4,021,251, Cl. 96-140.000.
Sato, Kazuhiro, to Mitsubishi Seiko Kabushiki Kaisha. Tire chain for the protection and slip prevention of vehicle tires. 4,020,885, Cl. 152-239.000.
Sato, Masanobu: *See*—
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.
Sato, Norio: *See*—
Murakami, Masuo; Takahashi, Kozo; Ozasa, Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, 4,021,434.
Sato, Tadashi: *See*—
Tanaka, Hidetoshi; Sato, Tadashi; and Kasamura, Toshiro, 4,021,109.
Sato, Teruo; and Michihata, Nobuharu, to Sony Corporation. Phase locked loop for use with local oscillator. 4,021,752, Cl. 331-17.000.
Sato, Tomoari: *See*—
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,021,315.
Satron, Inc.: *See*—
McLennan, Richard E.; and Looker, Robert, 4,020,770.
Satterfield, John J., III; and Swain, Kenneth E., to Americhem, Inc. Pigment metering and mixing apparatus. 4,021,022, Cl. 259-18.000.
Saufferer, Manfred; Spauszus, Siegfried; and Warkentin, Ulrich, to Kienzle Apparate GmbH. Method and apparatus for determining whether an electronic taximeter is in proper working order. 4,021,645, Cl. 235-92.0TC.
Saunders, Carl A., to Cardic and Company. Combined planter receptacle and plant support. 4,020,592, Cl. 47-71.000.
Saurino, Vincent R., to Research Lab Products, Inc. Oral bactericidal compositions. 4,021,537, Cl. 424-54.000.
Savage, Sidney Clifford, to Wildt Mellor Bromley Limited. Selector mechanisms. 4,020,652, Cl. 66-50.00R.
Saveliev, Alexei Ivanovich: *See*—
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.
Saxholm, Rolf. Apparatus associated with magnetically responsive, biologically active substance for testing thereof. 4,021,308, Cl. 195-127.000.
Saylor, William H.: *See*—
Narey, James O.; and Saylor, William H., 4,021,780.
Scalzo, Augustine J.; and Gunderlock, Richard P., to Westinghouse Electric Corporation. Rotor disk, blade, and seal plate assembly for cooled turbine rotor blades. 4,021,138, Cl. 416-95.000.
Schacht, Hans; Bauer, Eberhard; Wurth, Walter; Schleicher, Karl; and Soyer, Wolfgang, to Robert Bosch G.m.b.H. Liquid filter. 4,021,342, Cl. 210-94.000.
Schafer, Otmar U. Method and apparatus for the alternate heating and cooling of a heat exchanger of a heating and cooling apparatus. 4,020,895, Cl. 165-1.000.
Schaffer, Max A., to United Technologies Corporation. Temperature stabilized fluidic angular rate sensor. 4,020,699, Cl. 73-497.000.
Schaffer, Max A.: *See*—
Lopiccolo, Mario T.; Schaffer, Max A.; and Jachyra, George A., 4,020,700.
Schar, Hugo, to Rieter Machine Works, Ltd. Apparatus for producing waste and reserve windings on bobbin tubes on winding machines. 4,020,997, Cl. 242-18.0PW.
Schell, Allan C.; and Mailloux, Robert J., to United States of America, Air Force. Layered dielectric filter for sidelobe suppression. 4,021,812, Cl. 343-753.000.
Schempp, Heinrich, to Ciba-Geigy Corporation. Sulfinyl or sulfonyl-1-chloroacrylic acid amides. 4,021,482, Cl. 260-561.00S.
Scherbakov, Vitaly Fedorovich: *See*—
Gorchakov, Mikhail Fedorovich; Kabakov, Mikhail Grigorievich; Kashtanov, Leonid Nikolaevich; Morozov, Viktor Prokofievich; Chuprakov, Jury Ivanovich; and Scherbakov, Vitaly Fedorovich, 4,021,154.
Schering Aktiengesellschaft: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.
Arnold, Hanfried; Hilscher, Jean-Claude; and Wieske, Reinhold, 4,021,458.
Schering Corporation: *See*—
Green, Michael J., 4,021,459.
Nafissi-Varchei, Mohammad Mehdi, 4,021,570.
Schicketanz, Dieter, to Siemens Aktiengesellschaft. Method and apparatus for measuring the distance of a discontinuity of a glass fiber from one end of the fiber. 4,021,121, Cl. 356-237.000.
Schillinger, Ekkehard: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.
Schindler, Hans-Dieter, deceased: *See*—
Kummer, Rudolf; Schwirten, Kurt; Schindler, Hans-Dieter, deceased; Schindler, Maria Elisabeth; Lang, Ute; and Schindler, Rainer, heirs-at-law, 4,021,463.
Schindler, Maria Elisabeth: *See*—
Kummer, Rudolf; Schwirten, Kurt; Schindler, Hans-Dieter, deceased; Schindler, Maria Elisabeth; Lang, Ute; and Schindler, Rainer, heirs-at-law, 4,021,463.
Schindler, Rainer, heirs-at-law: *See*—
Kummer, Rudolf; Schwirten, Kurt; Schindler, Hans-Dieter, deceased; Schindler, Maria Elisabeth; Lang, Ute; and Schindler, Rainer, heirs-at-law, 4,021,463.

Schirneker, Hans-Ludwig. Firearms for selectively continuous and non-continuous operation. 4,020,740, Cl. 89-129.00B.

Schlegel, Albert, to Hoechst Aktiengesellschaft. Process for preparing $AlH_3(PO_4)_2.3\,H_2O$. 4,021,528, Cl. 423-308.000.

Schleicher, Karl: *See*—
Schacht, Hans; Bauer, Eberhard; Wurth, Walter; Schleicher, Karl; and Soyer, Wolfgang, 4,021,342.

Schlieckmann, Alfred, to Upjohn Company, The. Apparatus for the continuous manufacture of foamed hollow profiles. 4,021,173, Cl. 425-115.000.

Schloesser, Andreas; and Ramsch, Gerhard, to Hauni-Werke Korber & Co., KG. Apparatus for monitoring the operation of cigarette making machines or the like. 4,020,851, Cl. 131-21.00B.

Schmaeng, John F., to Beloit Corporation. Method and apparatus for supplying white water from a single silo in the formation of a multiply web. 4,021,295, Cl. 162-125.000.

Schmedemann, Walter: *See*—
Von Hacht, Reinhard; Rennicke, Klaus; and Schmedemann, Walter, 4,021,715.

Schmidt, Gerhard: *See*—
Gott, Hans; Ritter, Josef; Ritter, Klaus; Ritter, Gerhard; Zechner, Gottfreid; and Schmidt, Gerhard, 4,021,634.

Schmidt, Gunther; Engelhardt, Gunther; and Puschmann, Sigfrid, to Boehringer Ingelheim GmbH. 11-Aminoalkyl-pyridobenzodiazepinones and salts thereof. 4,021,557, Cl. 424-256.000.

Schmidt, Jurgen; and Hesse, Jurgen, to Messer Griesheim GmbH. Method of producing hollow articles of plastics material. 4,021,517, Cl. 264-85.000.

Schmidt, Richard; and Klemm, Kurt, to Byk Gulden Lomberg Chemische Fabrik GmbH. Derivatives of hydrazino-monosaccharides and aldohexoses which are useful as intermediates for preparing compounds or as compounds which lower the uric acid. 4,021,542, Cl. 424-180.000.

Schmiechen, Ralph: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.

Schmieder, Helmut: *See*—
Hausberger, Helmut; Goldacker, Hubert; and Schmieder, Helmut, 4,021,313.

Schmitt, Frederick Louis: *See*—
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, 4,021,488.

Schmitz, Reinold; and Wittig, Christoph M., to Bayer Aktiengesellschaft. Process for the manufacture of anthraquinonesulphonic acid. 4,021,455, Cl. 260-370.000.

Schmunk, John D., to Hancor, Inc. Alternator valve. 4,020,868, Cl. 137-610.000.

Schneider, Fritz: *See*—
Heinrich, Karl; and Schneider, Fritz, 4,021,520.

Schoen, William: *See*—
Kudchadker, Mohan V.; Walker, Thad O.; and Schoen, William, 4,021,356.

Scholl, Karl Heinz; and Grimm, Gerhard, to BASF Aktiengesellschaft. Manufacture of work-hardened wires and profiles. 4,021,521, Cl. 264-108.000.

Schrock, Richard Royce, to Du Pont de Nemours, E. I., and Company. Synthesis of ethylenically unsaturated compounds from esters or amides. 4,021,429, Cl. 260-293.510.

Schroeder, Eberhard: *See*—
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Schmiechen, Ralph; Schroeder, Eberhard; Loge, Olaf; Losert, Wolfgang; and Schillinger, Ekkehard, 4,021,450.

Schroeder, Michael J., to LaSalle Machine Tool, Inc. Part storage apparatus. 4,020,955, Cl. 214-16.40R.

Schromm, Kurt; Mentrup, Anton; Renth, Ernst-Otto; and Traunecker, Werner, to Boehringer Ingelheim GmbH. N,N'-bis-[(β-hydroxy-β-phenyl)-ethyl]-polymethylenediamines and salts thereof. 4,021,485, Cl. 260-570.600.

Schubach, Stanley D., to Tapehead Company, Inc. Apparatus for projecting enlarged video images. 4,021,105, Cl. 353-119.000.

Schulte, Milton Robert; and Swartz, George Albert, to Thermal Developments, Inc. Automatic flue gate. 4,021,187, Cl. 431-20.000.

Schulte, William Lester, Jr.: *See*—
Jones, Charlie Luther; and Schulte, William Lester, Jr., 4,021,620.

Schumacher, Martin: *See*—
Turek, Klaus; Schumacher, Martin; and Zimmermann, Richard, 4,021,211.

Schwaab, Lawrence T.: *See*—
Dalsin, Bernard L.; Dalsin, George J.; and Schwaab, Lawrence T., 4,020,754.

Schwab, Frederick C., to Mobil Oil Corporation. Detergent builders for washing and cleaning compositions. 4,021,359, Cl. 252-89.00R.

Schwab, Friedrich: *See*—
Legler, George; Hostettler, Hans; Lacoste, Jean-Pierre; and Schwab, Friedrich, 4,020,604.

Schwartz, Albert B.: *See*—
Wilson, Robert C., Jr.; and Schwartz, Albert B., 4,021,332.

Schwerdt, Loretta E.: *See*—
Svoboda, Donald J.; and Schwerdt, Loretta E., 4,021,585.

Schwirten, Kurt: *See*—
Kummer, Rudolf; Schwirten, Kurt; Schindler, Hans-Dieter, deceased; Schindler, Maria Elisabeth; Lang, Ute; and Schindler, Rainer, heirs-at-law, 4,021,463.

Scidmore, Wright H.: *See*—
Piotrowski, Casimir F.; Scidmore, Wright H.; O'Shaughnessy, Robert P.; Marasco, Nicholas P.; Cerrato, Louis R.; and Haines, Clarence C., Jr., 4,020,739.

Scodino, Ambrogio, to Saipem S.p.A. Articulated stand apparatus for laying and recovering pipeline. 4,020,952, Cl. 214-1.0PA.

Scott, Eric J. Y.: *See*—
Gorring, Robert L.; Scott, Eric J. Y.; and Smith, Robert L., 4,021,334.

Scott & Fetzer Company, The: *See*—
Upton, Albert E.; and McKee, Donald S., 4,020,888.

Scott, John: *See*—
Chiavola, Victor; Chiavola, George; and Scott, John, 4,020,968.

Scott nee Reid, Jennifer Joan: *See*—
Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, 4,020,643.

Scott Paper Company: *See*—
Peterson, John O. H., 4,020,762.

Scott, Paul F.: *See*—
Ahlgren, Frederic F.; and Scott, Paul F., 4,020,693.

Scovill Manufacturing Company: *See*—
Kruger, James Brompton; and Sonntag, Karl Frederick, 4,020,575.

Seaman, Harry V.: *See*—
Insetta, Victor; and Seaman, Harry V., 4,021,708.

Searle, Robert J. G.: *See*—
Davis, Royston H.; and Searle, Robert J. G., 4,021,466.

Secim: *See*—
Doudet, Michel, 4,020,668.

Sedco Products Ltd.: *See*—
Elderfield, David Henry Theophilus, 4,021,157.

Seeger, Ernst; Engel, Wolfhard; Nickl, Josef; and Teufel, Helmut, to Boehringer Ingelheim GmbH. Derivatives of 4-(4-biphenylyl)-butyric acid. 4,021,479, Cl. 260-520.00B.

Seeley, Dunham Briggs; and Hassel, David Robert, to Burroughs Corporation. Multipart business form or manifold having strippable label. 4,021,060, Cl. 282-28.00R.

Seffinga, Jouke; and Meyer, Andreas. Packaged tunnel-type greenhouse for row crop. 4,020,591, Cl. 47-28.00R.

Seha, Zdenek, to Ciba-Geigy AG. Process for the manufacture of aminoanthraquinones. 4,021,456, Cl. 260-378.000.

Sehring, Richard: *See*—
Grabinger, Hans; and Sehring, Richard, 4,021,424.

Seiden, Myron A.: *See*—
McCann, John J.; McCann, Mary A.; Plummer, William T.; Seiden, Myron A.; and Walworth, Vivian K., 4,021,825.

Seitzer, Walter H., to Suntech, Inc. Process for dissolving sub-bituminous coal. 4,021,329, Cl. 208-10.000.

Seki, Kazuyoshi: *See*—
Ijichi, Ichiro; Kai, Shigetoshi; Teranishi, Hikaru; Morioka, Akira; and Seki, Kazuyoshi, 4,021,391.

Sekida, Minoru, to Minolta Camera Kabushiki Kaisha. Camera attachment operating device for setting exposure factor. 4,021,829, Cl. 354-219.000.

Sekiguchi, Shizuo: *See*—
Ogoshi, Toshiaki; and Sekiguchi, Shizuo, 4,021,460.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
Nagare, Syoji; and Osawa, Kozo, 4,020,639.

Seragnoli, Enzo, to G. D. Societa per Azioni. Wrapping and sealing machine. 4,020,608, Cl. 53-234.000.

Sertori, Jean-Claude, to Labavia-S.G.E. Accelerator hydraulic control means for friction brakes. 4,020,931, Cl. 192-3.0TR.

Seyfried, Christoph; and Nowak, Herbert, to Merck Patent Gesellschaft mit beschrankter Haftung. Pharmaceutical preparation and method for treatment of parkinsonism. 4,021,555, Cl. 424-250.000.

SGS-ATES Componenti Elettronici S.p.A.: *See*—
Del Zotto, Giorgio; and Costa, Mario, 4,020,807.

Shaffer, John Richard: *See*—
Fuchs, Francis Joseph, Jr.; and Shaffer, John Richard, 4,021,156.

Shah, Pravin K., to B. F. Goodrich Company, The. Stable dispersions of water soluble amide polymers. 4,021,397, Cl. 260-29.60N.

Shames, Jerry, to Hiraoka New York, Inc. Cushioned insole for footwear such as shoes, boots, or the like. 4,020,570, Cl. 36-44.000.

Shaposhnikov, Anatoly Alexandrovich: *See*—
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.

Share, Stewart: *See*—
Epstein, Arnold S.; Share, Stewart; and Polimadei, Roland A., 4,021,834.

Sharp, Herbert J., to Bridgend Investments Limited. Method of forming an article including reinforcing elements encapsulated in thermoplastic material. 4,021,518, Cl. 264-92.000.

Sharp, Ronald Edward; and Willard, David Frank, to Motorola, Inc. Digital programmable tone detector. 4,021,653, Cl. 235-152.000.

Shay, Joseph John; and Falkowski, Donald Russell, to Summit Packaging Systems, Inc. Squeeze-bottle-type spray dispenser. 4,020,979, Cl. 222-211.000.

Shea, Frank Joseph. Mechanical lift. 4,021,070, Cl. 296-19.000.

Sheen, Edwin M.: *See*—
Collins, H. Dale; Sheen, Edwin M.; and Gribble, R. Parks, 4,021,771.

Shell Oil Company: *See*—
Davis, Royston H.; and Searle, Robert J. G., 4,021,466.

Huberts, Leo J. Th. J.; and Verschuur, Eke, 4,021,206.
Wulff, Harald P.; and Wattimena, Freddy, 4,021,454.

Shepard, David H., to Cognitronics Corporation. Character reading techniques. 4,021,777, Cl. 340-146.3AH.

Sheppard, Donald M.: *See—*
Doddington, Harold W.; and Sheppard, Donald M., 4,020,677.

Sheridon, Nicholas K.; and Kermisch, Dorian, to Xerox Corporation. Imaging system. 4,021,236, Cl. 96-1.500.

Sherman, Allen Butman, to E. S. Ritchie & Sons, Inc. Bearing compass. 4,020,559, Cl. 33-272.000.

Shetty, Ashok Kumar: *See—*
Dasan, Velu K. K., 4,021,018.

Shevels, Thomas Frederick: *See—*
Harris, Norman; Shevels, Thomas Frederick; and Dennis, Alan James, 4,021,370.

Shiba, Keisuke; Nakazyo, Kiyoshi; Ohi, Reiichi; and Adachi, Keiichi, to Fuji Photo Film Co., Ltd. Color photographic light-sensitive material. 4,021,248, Cl. 96-100.000.

Shibano, Yoshizo; Hatano, Tetsuo; and Ohkura, Toshihiko, to Sumitomo Electric Industries, Ltd. Method of manufacture of antenna reflector having a predetermined curved surface. 4,021,817, Cl. 343-912.000.

Shibata, Masashi: *See—*
Niimi, Itaru; Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; and Takahashi, Yoshitaka, 4,021,167.

Shifrin, Gordon A., to Hughes Aircraft Company. System for controlling ion implantation dosage in electronic materials. 4,021,675, Cl. 250-492.00A.

Shigita, Shozo: *See—*
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Shozo, 4,021,196.

Shigyo, Genshichi; and Nishio, Takuji, to Magstar Engineering Co., Ltd. Mobile surface cleaning and polishing apparatus. 4,020,597, Cl. 51-9.00M.

Shihabi, Marwan S., to International Telephone and Telegraph Corporation. Vapor recovery valve. 4,020,861, Cl. 137-100.000.

Shimamatsu, Hidenori; Yamada, Masaharu; Tanaka, Toshio; and Suzuki, Yahiko, to Dainippon Sugar Manufacturing Co., Ltd.; and Dainippon Ink and Chemicals, Incorporated. Process for continuous cultivation of protein-producing microorganisms. 4,021,304, Cl. 195-28.00R.

Shimizu, Hiroki: *See—*
Matsuda, Takayuki; Shimizu, Yoichi; Shimizu, Hiroki; Imazaki, Kazushi; and Nii, Setsuo, 4,021,205.

Shimizu, Noboru; Yoshida, Sadao; Kubota, Kunihiro; and Ohara, Takashi, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Method for inhibiting the polymerization of acrylic acid or its esters. 4,021,310, Cl. 203-8.000.

Shimizu, Yoichi: *See—*
Matsuda, Takayuki; Shimizu, Yoichi; Shimizu, Hiroki; Imazaki, Kazushi; and Nii, Setsuo, 4,021,205.

Shin-Etsu Chemical Industry Co., Ltd.: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.

Shinoda, Kazuo, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Vane-type rotary machines. 4,021,162, Cl. 418-82.000.

Shirn, George A., to Sprague Electric Company. Combination of capacitor in refrigerant system. 4,020,647, Cl. 62-508.000.

Shirn, George A.; and Pfister, William J., to Sprague Electric Company. Method of forming thin film resistor. 4,021,277, Cl. 156-657.000.

Showa Denko Kabushiki Kaisha: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; Yokoyama, Toshiro; and Kobayashi, Shoichi, 4,021,510.

Shulzhenko, Alexandr Alexandrovich; Vitjuk, Viktor Ivanovich; and Maslenko, Jury Savvich. High-pressure and high-temperature device. 4,021,171, Cl. 425-77.000.

Shumaker, Richard K.; and Harris, William G., Jr., to United States of America, Navy. Mooring cable cutting system. 4,020,780, Cl. 114-243.000.

Shuster, Edward J.: *See—*
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, 4,021,494.

SI Handling Systems, Inc.: *See—*
Newbegin, John, 4,020,768.

Sibbett, Wilson: *See—*
Bradley, Daniel Joseph; and Sibbett, Wilson, 4,021,693.

Sickinger, Albert E., to Hans Sickinger Co. Heat shrink packaging machine. 4,020,617, Cl. 53-229.000.

Siegesleitner, Peter: *See—*
Vieweg-Gutberlet, Fritz; and Siegesleitner, Peter, 4,021,735.

Siemens Aktiengesellschaft: *See—*
Franke, Kurt, 4,021,672.
Frei, Gerhard, 4,021,301.
Hofmeister, Helmut, 4,021,797.
Koops, Hans, 4,021,674.
Reuschel, Konrad; Keller, Wolfgang; Kersting, Arno; and Emeis, Reimer, 4,020,791.
Rimmrott, Manfred, 4,021,702.
Schicketanz, Dieter, 4,021,121.
Stein, Karl-Ulrich; and Horninger, Karlheinrich, 4,021,787.
Weber, Robert, 4,021,297.

Sigma-Tau Industrie Farmaceutiche Riunite S.p.A.: *See—*
Cavazza, Claudio, 4,021,433.
Cavazza, Claudio, 4,021,435.

Sigott, Siegfried; Zitz, Alfred; and Suessenbeck, Heinrich, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Shield structure. 4,020,640, Cl. 61-45.00D.

Sillmann, Manfred: *See—*
Haas, Klaus Dieter; and Sillmann, Manfred, 4,021,665.

Silrec Systems, Inc.: *See—*
Moeglich, Karl, 4,021,319.
Moeglich, Karl, 4,021,320.

Simmonds Precision Products, Inc.: *See—*
Franklin, Cecil, 4,020,691.

Simon, Lionel N.: *See—*
Springer, Robert H.; O'Brien, Darrell E.; and Simon, Lionel N., 4,021,556.

Simplimatic Engineering Co.: *See—*
Kennedy, Francis Millard, 4,020,941.

Sing, Edmond L. Culture of sour dough bacteria. 4,021,581, Cl. 426-61.000.

Singer Company, The: *See—*
Du Bois, Edward F., 4,020,547.
Fromknecht, Charles T.; and Carnes, Donald W., 4,020,525.
Mahon, Joseph J.; Redfield, William; and Supel, Ignacy, 4,020,625.
Mishcon, Lester; and Reagan, Donald William, 4,020,653.

Sinka, Joseph V.; and Lichtman, Irwin A., to Diamond Shamrock Corporation. Silica base defoamer compositions with improved stability. 4,021,365, Cl. 252-321.000.

Siposs, Geza: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Siposs, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.

Skagit Corporation: *See—*
Kitt, Daniel G., 4,020,779.

Skala, Stephen F. Internal combustion engine fueled by NaK. 4,020,798, Cl. 123-1.00A.

Skarman, John: *See—*
Ludt, Roy R.; Eggert, Carl A.; and Skarman, John, 4,021,792.

Skelly, James Kenneth; and Farrington, Michael, to Ciba-Geigy Corporation. Production of images. 4,021,059, Cl. 282-27.500.

Slatter, John Reginald; Jackson, James Albert; Brooks, John Gedny; Ward, Albert John Clark; and Dewhurst, Alan, to Dewhurst & Partner Limited. Brake apparatus including pressed or stamped components. 4,020,926, Cl. 188-75.000.

Slaughter, Edward R., to United Technologies Corporation. Sandwich panel fabrication. 4,020,542, Cl. 29-411.000.

Slavinski, Ivan Assenov; Angelov, Todor Dimitrov; Vukolov, Dmitri Dmitrievich; Burgudjiev, Eduard Todorov; and Komitovski, Mihail Dimitrov, to DSO "ZMM". Apparatus for automatic tool changing in a lathe. 4,020,545, Cl. 29-568.000.

Smart, Bruce Edmund: *See—*
Krespan, Carl George; and Smart, Bruce Edmund, 4,021,489.

Smith, Alexander M., II, to Fiberwoven Corporation, The. Needled fabric structure. 4,021,593, Cl. 428-300.000.

Smith, Alvin Jack. Aerated sewerwage effluent disposal system. 4,021,348, Cl. 210-208.000.

Smith, Donald William: *See—*
Potter, Arthur Robin; and Smith, Donald William, 4,021,619.

Smith, Edward A.; and Day, Robert L. Method of forming and locating molding clip registers in a metal door frame. 4,020,544, Cl. 29-513.000.

Smith, Eugene G., to Robertshaw Controls Company. Thermocouple assembly with a sheath. 4,021,268, Cl. 136-228.000.

Smith, Kevin R., to Dazey Products Company. Bag sealer apparatus. 4,021,290, Cl. 156-510.000.

Smith, Michael W.: *See—*
Houck, Stanley J.; and Smith, Michael W., 4,020,719.

Smith Pipe and Steel Co.: *See—*
Welch, William T., 4,020,612.

Smith, Robert L.: *See—*
Gorring, Robert L.; Scott, Eric J. Y.; and Smith, Robert L., 4,021,334.

Smith, Sidney Edwin; O'Reilly, Kevin Joseph; and Prydie, John, to Burroughs Wellcome & Co., Inc. Cell cultures. 4,021,302, Cl. 195-1.800.

Smith, Wendal I., to Standard Oil Company (Indiana). Collapsible core. 4,021,180, Cl. 425-392.000.

Smithers, James P., to Armour and Company. Packing strips of material. 4,020,614, Cl. 53-26.000.

Snider, Cleo E. Bite signalling attachment for ice fishing pole. 4,020,579, Cl. 43-17.000.

Snyder, William H., II: *See—*
DeVries, Roy F.; and Snyder, William H., II, 4,021,591.

Societa' Farmaceutici Italia S.p.A.: *See—*
Arcamone, Federico; and Cassinelli, Giuseppe, 4,021,601.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Piccolo, Luigi; Ghirga, Marcello; and Paolinelli, Antonio, 4,021,533.

Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Montefusco, Nicola, 4,021,744.

Societe d'Assistance Technique pour Produits Nestle S.A.: *See—*
Hsu, Jau Yann, 4,021,582.
Wuhrmann, Jean-Jacques; and van de Rovaart, Paul, 4,021,175.

Societe d'Equipements, Manutentions et Transports (S.E.M.A.T.): *See—*
Colin, Marcel, 4,020,962.

Societe Sodermec: *See—*
Cournut, Rene; and Gaussens, Gilbert, 4,020,558.

Soderkvist, Anton; and Lycke, Hans, to LKB-Produkter AB. Method in

a microtome for approaching the knife to the specimen. 4,021,118, Cl. 356-156.000.
Sokolov, Nikolai Vasilievich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.
Sola Basic Industries, Inc.: *See—*
Pennings, Matheus D., 4,020,543.
Sollars, Merle L., to Steel Belt, Inc. Speed reducer and housing therefor. 4,020,715, Cl. 74-606.00R.
Sollberger, Urs: *See—*
Mayerhoefer, Horst; Mueller, Wolfgang; and Sollberger, Urs, 4,021,464.
Solomon, David E.: *See—*
Budrick, Ronald G.; King, Frank T.; Nolen, Robert L., Jr.; and Solomon, David E., 4,021,253.
Solomon, Elias E., to Gulf & Western Manufacturing Company (Systems). Ionization detector. 4,021,671, Cl. 250-381.000.
Sonntag, Karl Frederick: *See—*
Kruger, James Brompton; and Sonntag, Karl Frederick, 4,020,575.
Sony Corporation: *See—*
Akiba, Kosuke, 4,020,875.
Amano, Yoshifumi, 4,021,607.
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 4,021,316.
Ishigaki, Yoshio; Hongu, Masayuki; and Okada, Takashi, 4,021,749.
Machida, Yukihiko, 4,021,742.
Makino, Yoshimi; and Ookubo, Hiroyuki, 4,021,728.
Morii, Kokichi; and Urayama, Ken-Ichi, 4,021,761.
Ogawa, Kazuaki, 4,021,239.
Sato, Teruo; and Michihata, Nobuharu, 4,021,752.
Suzuki, Tadao; and Yoshida, Tadao, 4,021,745.
Suzuki, Tadao, 4,021,746.
Suzuki, Tadao, 4,021,751.
Yoshida, Tadao; and Suzuki, Tadao, 4,021,748.
Soper, Richard S., Jr., to United States of America, Agriculture. Process for the production and germination of Entomophthora resting spores. 4,021,306, Cl. 195-81.000.
Sotman, Kurt, to Star Dental Manufacturing Co., Inc. Air driven dental handpiece. 4,020,556, Cl. 32-27.000.
Soyer, Wolfgang: *See—*
Schacht, Hans; Bauer, Eberhard; Wurth, Walter; Schleicher, Karl; and Soyer, Wolfgang, 4,021,342.
Spargo, William E.: *See—*
Standart, Melvin W.; and Spargo, William E., 4,021,363.
Spauszus, Siegfried: *See—*
Saufferer, Manfred; Spauszus, Siegfried; and Warkentin, Ulrich, 4,021,645.
Spectra-Physics, Inc.: *See—*
Conrotto, Paul A.; and Jones, Henry W., 4,020,924.
Speiser, Dr. Peter, Prof.: *See—*
Speiser, Peter; and Birrenbach, Gerd, 4,021,364.
Speiser, Peter; and Birrenbach, Gerd, to Speiser, Dr. Peter, Prof. Microcapsules in the nanometric range and a method for their production. 4,021,364, Cl. 252-316.000.
Sperry Rand Corporation: *See—*
Baker, Donald H.; Bowe, Larry J.; Manning, Kenzel P.; and Post, William C., 4,021,009.
Kimlinger, Joseph Anthony, 4,021,784.
McConnell, George A., 4,021,706.
McMahon, Donald H., 4,021,097.
Murphy, John V., 4,021,853.
Yatcilla, George E., 4,020,913.
Spies, Johann: *See—*
Held, Manfred; and Spies, Johann, 4,021,057.
Spiral Binding Company, Inc.: *See—*
Gomez, Albert, 4,020,516.
Spisiak, Juraj; Jansa, Milos; Bezdek, Miloslav; and Ferdus, Stanislav, to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi. Weft injection sequence controller for a fluid-jet loom. 4,020,877, Cl. 139-435.000.
Spitfire Tool & Machine Co., Inc.: *See—*
Day, Lawrence, 4,020,600.
Splatt, Reginald John Kingston, to National Research Development Corporation. Electronic switching circuits. 4,021,683, Cl. 307-252.0UA.
Sprague Electric Company: *See—*
Shirn, George A., 4,020,647.
Shirn, George A.; and Pfister, William J., 4,021,277.
Sprando, Anthony Edward. Electrical header device. 4,021,631, Cl. 200-238.000.
Spratt, Brendan J., to Bendix Corporation, The. Real time threshold. 4,021,808, Cl. 343-113.00R.
Sprecher & Schuh AG: *See—*
Amsler, Joachim, 4,021,629.
Sprecker, Mark A.: *See—*
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, 4,021,488.
Springer, Robert H.; O'Brien, Darrell E.; and Simon, Lionel N., to ICN Pharmaceuticals, Inc. Xanthine oxidase inhibitors. 4,021,556, Cl. 424-251.000.
Springrose, B. Steven: *See—*
Cosentino, Louis C.; and Springrose, B. Steven, 4,021,341.
Sproat, Alan Conrad, to Imperial Chemical Industries Limited. Cores for use in reeling up sheet materials. 4,021,001, Cl. 242-68.500.
Srivastava, Gopal Krishna; and Wheeler, Robert Charles, to GTE Sylvania Incorporated. Adjustable aperture correction system. 4,021,848, Cl. 358-162.000.
Stackpole Machinery Company: *See—*
Total, Robert V., 4,021,293.
Stahlberg, Wallis: *See—*
Lindbladh, Stig; and Stahlberg, Wallis, 4,020,528.
Stahle, Helmut: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; Engelhardt, Albrecht; and Taunecker, Werner, 4,021,576.
Stal-Refrigeration AB: *See—*
Glanvall, Rune; Kalen, Hans; and Pettersson, Kurt, 4,021,166.
Stamberg, Jiri: *See—*
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, 4,021,368.
Stamberg, Karel: *See—*
Nemec, Pavel; Prochazka, Hubert; Stamberg, Karel; Katzer, Josef; Stamberg, Jiri; Jilek, Rudolf; and Hulak, Pavel, 4,021,368.
Stamicarbon B.V.: *See—*
De Rooij, Abraham H.; and Elmendorp, Jan, 4,021,422.
Standard Oil Company (Indiana): *See—*
Beaton, William Ingram, 4,021,335.
Broding, Robert A., 4,020,919.
Krueger, David F.; and Kaliszewski, Edmond S., 4,021,519.
Meguerian, Garbis H.; and Rakowsky, Frederick W., 4,021,372.
Smith, Wendal I., 4,021,180.
Stasi, Michael A., 4,021,024.
Standard Oil Company (Ohio), The: *See—*
Dolhyj, Serge R.; and Milberger, Ernest C., 4,021,427.
Standart, Melvin W.; and Spargo, William E., to Aerojet-General Corporation. Material for immobilization of toxic particulates. 4,021,363, Cl. 252-301.10W.
Standing, Arthur Frederick, to Communications Satellite Corporation (Comsat). Direct modulation 4 phase PSK modulator. 4,021,758, Cl. 332-21.000.
Stangl, Georg: *See—*
Andersen, Heinz-Erhardt; and Stangl, Georg, 4,021,170.
Stankowski, Stanley: *See—*
Gross, Joseph; and Stankowski, Stanley, 4,021,032.
Star Dental Manufacturing Co., Inc.: *See—*
Sotman, Kurt, 4,020,556.
Star Expansion Industries Corporation: *See—*
Bell, Walter, 4,020,734.
Stasi, Michael A., to Standard Oil Company (Indiana). Perforated baffle-impeller and process of concentrating dense masses. 4,021,024, Cl. 259-109.000.
Stauffer Chemical Company: *See—*
Arneklev, Duane R.; and Baker, Don R., 4,021,228.
Arneklev, Duane R.; and Baker, Don R., 4,021,229.
Baker, Don R., 4,021,420.
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,021,224.
Stauffer, Norman L., to Honeywell Inc. Position gauge. 4,021,119, Cl. 356-159.000.
Stauffer, R. Thomas. Wall-mountable dispensing device for bulk and encapsulated materials. 4,020,975, Cl. 222-93.000.
Steed, Michael Halsey, to Fafco Incorporated. Pressure relief valve apparatus and method. 4,020,828, Cl. 126-271.000.
Steel Belt, Inc.: *See—*
Soliars, Merle L., 4,020,715.
Steffen, Sylvester L. Draft inducing roof for storage structures. 4,020,565, Cl. 34-93.000.
Steigerwald Strahltechnik GmbH: *See—*
von Walter, Alfred, 4,021,636.
Stein, Karl-Ulrich; and Horninger, Karlheinrich, to Siemens Aktiengesellschaft. Information storage circuit employing MNOS transistors. 4,021,787, Cl. 340-173.00R.
Steingroever, Erich, to Elektro-Physik, Hans Nix & Dr. -Ing. E. Steingroever KG. Apparatus and process for multipolar magnetization of magnetic information storage sheets. 4,021,763, Cl. 335-284.000.
Steinle, Gerhart; and Rossmann, Siegfried, to Urgos Uhrenfabrik Schwenningen a.N. Haller, Jauch und Pabst. Pendulum clock. 4,020,624, Cl. 58-2.000.
Stephan, Karl Heinz, to Lear Siegler, Inc. Air diffuser with modular core. 4,020,752, Cl. 98-40.00D.
Steppan, Hartmut; and Ruckert, Hans, to Hoechst Aktiengesellschaft. Diazo light-sensitive copying composition and process of using in the manufacture of screen printing stencils. 4,021,243, Cl. 96-36.400.
Sterling Drug Inc.: *See—*
Bell, Malcolm Rice, 4,021,448.
Bell, Malcolm Rice, 4,021,566.
Lorenz, Roman R., 4,021,437.
Zenitz, Bernard L., 4,021,431.
Stevenson, Cleatus G. Draw clamp. 4,021,516, Cl. 269-41.000.
Stichting Reactor Centrum Nederland: *See—*
Hirs, Gilles Gerardus, 4,021,279.
Stillman, Ronald G.: *See—*
Fawcett, James M., Jr.; and Stillman, Ronald G., 4,021,796.
Stockdale, George Fairbank; and Cooper, John Leslie, to RCA Corpo-

ration. Method of making a composite glass structure. 4,021,219, Cl. 65-43.000.
Stokes, Henry W. Splinter puller. 4,020,846, Cl. 128-305.000.
Stol, Miroslav: *See—*
Stoy, Artur; Stoy, Vladimir; and Stol, Miroslav, 4,021,382.
Stone Manganese Marine Limited: *See—*
May, Eric Raymond, 4,021,143.
Stotz, Charles: *See—*
Moakler, William A.; and Stotz, Charles, 4,021,678.
Stoy, Artur; Stoy, Vladimir; and Stol, Miroslav, to Ceskoslovenska akademie ved. Method for the preparation of hydrophilic spongy gels. 4,021,382, Cl. 260-2.50M.
Stoy, Vladimir: *See—*
Stoy, Artur; Stoy, Vladimir; and Stol, Miroslav, 4,021,382.
Straffi, Franco, to Breda Termomeccanica S.p.A. Method of manufacturing a grill-type support comprising two different materials and capable of being initially rigid, while allowing differential thermal expansions after installation. 4,021,204, Cl. 29-157.30R.
Strapex AG: *See—*
Weiss, Max, 4,020,756.
Strehler, Richard: *See—*
Eichinger, Johann; Strehler, Richard; and Burzlauer, Gert, 4,020,934.
Streich, Martin; and Jakob, Fritz, to Linde Aktiengesellschaft. Adsorption system. 4,021,210, Cl. 55-26.000.
Stribrsky, William: *See—*
Nelson, David M.; Stribrsky, William; and Britz, John A., 4,021,056.
Stromberg-Carlson Corporation: *See—*
Kelly, Patrick M.; and Dorazio, Alton, 4,021,624.
Structural Instrumentation, Inc.: *See—*
English, David C.; McCauley, Jerry L.; and Holmstrom, Godfrey A., 4,020,911.
Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds as antiarrhythemic agents. 4,021,575, Cl. 424-329.000.
Stuckey, Ronald L., to CTS Corporation. Variable resistance control with multiple paddle contactor and method of making the same. 4,021,768, Cl. 338-180.000.
Stumpp, Werner: *See—*
Muller, Hans; and Stumpp, Werner, 4,021,120.
Stuppy, George H.: *See—*
Binger, Wayne W.; Collins, John W., III; Fahnestock, Melvin R.; and Stuppy, George H., 4,020,992.
Suda, Ryuichi: *See—*
Katagiri, Yoshio; and Suda, Ryuichi, 4,021,800.
Sudo, Michio: *See—*
Nonaka, Kohei; and Sudo, Michio, 4,021,767.
Suessenbeck, Heinrich: *See—*
Sigott, Siegfried; Zitz, Alfred; and Suessenbeck, Heinrich, 4,020,640.
Suga, Shigeru. Apparatus for sequential measurement of light transmitted through smoke. 4,021,713, Cl. 250-574.000.
Sugawara, Hiroyuki: *See—*
Kuwabara, Kooji; Sugawara, Hiroyuki; and Miyashita, Takao, 4,021,633.
Sugimura, Kazuo: *See—*
Sugimura, Nobuyuki; and Sugimura, Kazuo, 4,020,872.
Sugimura, Nobuyuki; and Sugimura, Kazuo. Accumulator. 4,020,872, Cl. 138-30.000.
Sugita, Toshikazu: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.
Sugiura, Yoji: *See—*
Uchiyama, Takashi; Mashimo, Yukio; Nakamura, Zenzo; and Sugiura, Yoji, 4,021,824.
Sullivan, Bruce M.: *See—*
Anderson, Erland D.; Paulson, David S.; and Sullivan, Bruce M., 4,020,783.
Sumitomo Chemical Company, Limited: *See—*
Hosaka, Hirokazu; Tanaka, Kunihiko; and Ueda, Yuji, 4,021,495.
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,021,315.
Yano, Kimio; Nagai, Tadaaki; Matsumoto, Koji; Nagayasu, Motokiyo; and Tanaka, Junichi, 4,021,318.
Sumitomo Electric Industries, Ltd.: *See—*
Shibano, Yoshizo; Hatano, Tetsuo; and Ohkura, Toshihiko, 4,021,817.
Sumiyoshi, Masaharu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,020,817.
Sumiyoshi, Toshinari, to Nisshin Sangyo Kabushiki Kaisha. Multiple pressure compensated flow control valve device of parallel connection used with fixed displacement pump. 4,020,867, Cl. 137-596.130.
Summit Packaging Systems, Inc.: *See—*
Shay, Joseph John; and Falkowski, Donald Russell, 4,020,979.
Sun Oil Company of Pennsylvania: *See—*
Keenan, Bernard J., 4,021,773.
Sun Shipbuilding and Dry Dock Company: *See—*
Vulovic, Radoje, 4,020,954.
Sun Ventures, Inc.: *See—*
Lyons, James E., 4,021,369.
Sunds Aktiebolag: *See—*
Bohlmark, Sven Arne, 4,020,755.
Sundstrand Corporation: *See—*
Erikson, Robert W.; and Harwath, Frank L., 4,021,155.
Suntech, Inc.: *See—*
Seitzer, Walter H., 4,021,329.
Supel, Ignacy: *See—*
Mahon, Joseph J.; Redfield, William; and Supel, Ignacy, 4,020,625.
Sutter, Jean Georges: *See—*
Maeder, Claude; and Sutter, Jean Georges, 4,021,015.
Suttie, John W., to Wisconsin Alumni Research Foundation. Rodenticidal compositions containing 2-chloro-3-phytyl-1,4-naphthaquinone and warfarin. 4,021,568, Cl. 424-281.000.
Sutton, Robert W. Hatch cover. 4,020,778, Cl. 114-203.000.
Suyderhoud, Henri G.; Onufry, Michael, Jr.; and Kauffman, Eric R., to Communications Satellite Corporation (Comsat). Automatic H-register clear for prevention of erroneous convolution in digital adaptive echo canceller. 4,021,623, Cl. 179-170.200.
Suzuki, Hiroshi: *See—*
Fujiwara, Hiroshi; and Suzuki, Hiroshi, 4,021,403.
Suzuki, Kiyoshi: *See—*
Kawashima, Hirokuni; and Suzuki, Kiyoshi, 4,021,237.
Suzuki, Mikio; and Hattori, Yoshiyuki, to Nippon Soken, Inc. Safety bag device for vehicle. 4,021,058, Cl. 280-737.000.
Suzuki, Tadao; and Yoshida, Tadao, to Sony Corporation. Pulse width modulated signal amplifier. 4,021,745, Cl. 330-10.000.
Suzuki, Tadao, to Sony Corporation. Transistor amplifier having field effect transistors with stabilized drain bias current. 4,021,746, Cl. 330-13.000.
Suzuki, Tadao, to Sony Corporation. Field effect transistor amplifier. 4,021,751, Cl. 330-35.000.
Suzuki, Tadao: *See—*
Yoshida, Tadao; and Suzuki, Tadao, 4,021,748.
Suzuki, Yahiko: *See—*
Shimamatsu, Hidenori; Yamada, Masaharu; Tanaka, Toshio; and Suzuki, Yahiko, 4,021,304.
Svensson, Stig Lennart, to Incentive AB. Microwave oscillator having negative resistance diode inductively and capacitively mounted in waveguide cavity. 4,021,755, Cl. 331-96.000.
Svoboda, Donald J.; and Schwerdt, Loretta E., to Krey Packing Company. Chlorine dioxide spray process for chilling meat carcasses. 4,021,585, Cl. 426-332.000.
Swain, Kenneth E.: *See—*
Satterfield, John J., III; and Swain, Kenneth E., 4,021,022.
Swann, Ferris George; and Beckmann, Martin Josef, to Porta-Test Manufacturing Ltd. Gas burner. 4,021,189, Cl. 431-202.000.
Swartz, George Albert: *See—*
Schulte, Milton Robert; and Swartz, George Albert, 4,021,187.
Sweeton, Gerard F., to Vivitronics Corporation. Magnetic board game. 4,021,042, Cl. 273-131.0AD.
Swenson, William J., to Raymond International Inc. Control of hydraulically powered equipment. 4,020,744, Cl. 91-216.00B.
Swingle, George E.: *See—*
Hannon, Donald F.; and Swingle, George E., 4,021,288.
Swithenbank, Joshua: *See—*
Tippetts, John Russell; and Swithenbank, Joshua, 4,021,146.
Sykes, Christopher C., to Nexus Manufacturing Limited. Mechanical connections between adjacent members. 4,021,129, Cl. 403-252.000.
Sylvest, Karl Jens, to F. L. Smidth & Co. Planetary cooler system for rotary drums such as kilns. 4,021,195, Cl. 432-80.000.
Synthelabo: *See—*
Giudicelli, Don Pierre Rene Lucien; and Najer, Henry, 4,021,559.
Kaplan, Jean Pierre; Raizon, Bernard Michel; Obitz, Daniel Charles Leon; Manqury, Philippe Michel Jacques; Najer, Henry; Jalfre, Maurice; and Giudicelli, Don Pierre Rene Lucien, 4,021,567.
Plat, Michel Marie Rene; and Plat born Berry, Monique, 4,021,430.
Szczepanski, Harry. Manually-operated dispenser. 4,020,978, Cl. 222-209.000.
Szeberenyi, Szabolcs: *See—*
Kisfaludy, Lajos; Rohricht, Julianna; Urogdi, Laszlo; Szeberenyi, Szabolcs; Palosi, Eva; and Szporny, Laszlo, 4,021,421.
Szeiler nee Nemeth, Margit: *See—*
Gal, Sandor; Eross, Bela; Pungor, Erno; Siposs, Geza; Monostory, Adorjan; Barlai, Jozsef; and Szeiler nee Nemeth, Margit, 4,021,367.
Szekely, Andrew Geza, to Union Carbide Corporation. Protection for externally heated cast iron vessel used to contain a reactive molten metal. 4,021,026, Cl. 266-275.000.
Szporny, Laszlo: *See—*
Kisfaludy, Lajos; Rohricht, Julianna; Urogdi, Laszlo; Szeberenyi, Szabolcs; Palosi, Eva; and Szporny, Laszlo, 4,021,421.
Szpur, Roman, to Panabeam Corporation. Light fixture. 4,021,660, Cl. 240-41.550.
Tabuchi, Toyoji: *See—*
Kojima, Hiroomi; Zama, Hideo; Nomura, Sadao; Tabuchi, Toyoji; and Murata, Ryozo, 4,021,798.
Tachibana, Kyozo, to Hitachi, Ltd. AC-to-DC converter. 4,021,721, Cl. 321-47.000.
Tada, Junichi: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 4,021,316.
Tada, Yoshiro: *See—*
Oyama, Mitsukazu; Tada, Yoshiro; and Sakamoto, Yasuhiko, 4,021,609.

Taguchi, Tetsuya: *See—*
Iura, Yukio; Yamamichi, Masayoshi; Uchiyama, Takashi; Taguchi, Tetsuya; and Mashimo, Yukio, 4,021,828.

Taisan Industrial Co., Ltd.: *See—*
Toyoda, Akira, 4,021,152.

Tajima, Yuzo; and Okada, Toru, to Minolta Camera Kabushiki Kaisha. Planetarium moon projector. 4,020,568, Cl. 35-42.500.

Takada, Hiroshi, to Kabushiki Kaisha Komatsu Seisakusho. Method of laying pipes in the ground. 4,020,641, Cl. 61-72.700.

Takahashi, Kozo: *See—*
Murakami, Masuo; Takahashi, Kozo; Ozasa, Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, 4,021,434.

Takahashi, Nagashige. Automatic exposure controlling photometric device in an endoscope. 4,021,663, Cl. 250-227.000.

Takahashi, Ryoji: *See—*
Makino, Michio; Kawai, Takashi; Takahashi, Ryoji; Kubo, Yoshimi; and Obata, Fumio, 4,021,232.

Takahashi, Susumu, to Sansui Electric Co., Ltd. Decoder apparatus applicable to matrix 4-channel systems of different types. 4,021,612, Cl. 179-1.0GQ.

Takahashi, Yoshitaka: *See—*
Niimi, Itaru; Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; and Takahashi, Yoshitaka, 4,021,167.

Takamiya, Takehisa: *See—*
Morimoto, Toshio; and Takamiya, Takehisa, 4,021,006.

Takamizawa, Minoru: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.

Takeda, Yasutsugu; Tsunoda, Yoshito; Imagawa, Fumio; Kataoka, Keiji; and Tatsuno, Kimio, to Hitachi, Ltd. Hologram apparatus. 4,021,606, Cl. 358-130.000.

Takei, Haruo: *See—*
Sato, Akira; Ogawa, Akira; Hinata, Masanao; and Takei, Haruo, 4,021,251.

Takemoto, Shigeji; and Nishitani, Kazuhisa. Front loading cassette tape machine. 4,021,005, Cl. 242-198.000.

Takemoto, Tadashi; Kakizaki, Fusayoshi; Ariyoshi, Yasuo; and Noda, Ichiro, to Ajinomoto Co., Inc. Method of removing formyl groups from N-formyl-amino acid and N-formyl-peptide esters. 4,021,418, Cl. 260-112.50R.

Takenaka, Toichi: *See—*
Murakami, Masuo; Takahashi, Kozo; Ozasa, Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, 4,021,434.

Takeno, Keigo; Matsunaga, Yasuyuki; Nomura, Ryoichi; and Nagata, Akihiro, to Bando Chemical Industries, Ltd. Safety device for conveyor belt. 4,020,945, Cl. 198-502.000.

Takita, Hitoshi: *See—*
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, 4,021,390.

Tallqvist, Henry Stefan: *See—*
Urpo, Seppo I.; Tallqvist, Henry Stefan; and Tiuri, Martti E., 4,021,810.

Tamazawa, Kazuharu: *See—*
Murakami, Masuo; Takahashi, Kozo; Ozasa, Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, 4,021,434.

Tan, William Eric: *See—*
Banczak, Daniel Philip; and Tan, William Eric, 4,021,252.

Tanaka, Hidetoshi; Sato, Tadashi; and Kasamura, Toshiro, to Canon Kabushiki Kaisha. Electrophotographic copying apparatus. 4,021,109, Cl. 355-8.000.

Tanaka, Junichi: *See—*
Yano, Kimio; Nagai, Tadaaki; Matsumoto, Koji; Nagayasu, Motokiyo; and Tanaka, Junichi, 4,021,318.

Tanaka, Kenichi: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.

Tanaka, Kunihiko: *See—*
Hosaka, Hirokazu; Tanaka, Kunihiko; and Ueda, Yuji, 4,021,495.

Tanaka, Taro: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,020,817.

Tanaka, Toshio: *See—*
Shimamatsu, Hidenori; Yamada, Masaharu; Tanaka, Toshio; and Suzuki, Yahiko, 4,021,304.

Tanaka, Yasuzi: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; Yokoyama, Toshiro; and Kobayashi, Shoichi, 4,021,510.

Tanaka, Yukiyasu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,020,817.

Tanazawa, Yasushi: *See—*
Konomi, Toshiaki; Nurita, Joji; and Tanazawa, Yasushi, 4,020,805.

Taniguchi, Yoshisada; Tsuji, Toshihiko; and Oguino, Masanori, to Hitachi, Ltd. Color tone control device in color television receiver. 4,021,843, Cl. 358-29.000.

Tanimura, Hirozo. Magnetic recording system for reproducing successive still pictures. 4,021,857, Cl. 360-84.000.

Tapehead Company, Inc.: *See—*
Schubach, Stanley D., 4,021,105.

Tardiff, Daniel A.: *See—*
Bolle, Fred; Lee, Chen Yi; and Tardiff, Daniel A., 4,021,679.

Tatsuno, Kimio: *See—*
Takeda, Yasutsugu; Tsunoda, Yoshito; Imagawa, Fumio; Kataoka, Keiji; and Tatsuno, Kimio, 4,021,606.

Taunecker, Werner: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; Engelhardt, Albrecht; and Taunecker, Werner, 4,021,576.

Tauszig, Julio G., to A. B. Dick Company. Electronic circuit for electronic stencil cutter. 4,021,605, Cl. 358-297.000.

Taxil, Andre Marc Victorin; Divoux, Jacques Clement; and Demaeyer, Joseph Henri, to ITT Industries, Inc. Ultraviolet discharge lamp. 4,021,696, Cl. 313-229.000.

Taylor, Charles E., to Neomed Incorporated. Hermetically sealed resilient contact switch having surgical applications. 4,021,630, Cl. 200-159.00B.

Taylor, Glenn R.: *See—*
Gary, Wardell; Taylor, Glenn R.; and Kimmel, Donald S., 4,021,703.

Taylor, Robert N. Energy storage apparatus. 4,020,923, Cl. 185-11.000.

Tchon, Wallace E.: *See—*
Elmer, Ben R.; and Tchon, Wallace E., 4,021,682.

Tech, Donald D., to Inforex, Inc. Pattern recognition system. 4,021,776, Cl. 340-146.3MA.

Technicon Instruments Corporation: *See—*
Adler, Stanford L., 4,020,831.

Teege, Gernot: *See—*
Horn, Peter; Teege, Gernot; Fliege, Werner; Weiss, Frank; and Meissner, Bernd, 4,021,408.

Teeney, David D.: *See—*
Harding, Maurice R.; and Teeney, David D., 4,020,518.

Teijin Limited: *See—*
Uogaeshi, Shinobu, 4,021,258.

Teikoku Piston Ring Co. Ltd.: *See—*
Matsuda, Takayuki; Shimizu, Yoichi; Shimizu, Hiroki; Imazaki, Kazushi; and Nii, Setsuo, 4,021,205.

Telakowski, Robert: *See—*
Rosenbush, Fred M.; and Telakowski, Robert, 4,021,215.

Teleco Inc.: *See—*
Asmundsson, Einar; and Grosso, Donald S., 4,021,774.

Teledyne, Inc.: *See—*
Bubbers, John J., 4,021,614.

Telefonaktiebolaget L M Ericsson: *See—*
Jaki, Ivan, 4,021,762.

Tell, Hans Peter, to AB Piab. Pump having reciprocating pumping means. 4,021,164, Cl. 417-390.000.

Teller, Ray E.; and Zachar, Sem G. Sewage treatment system. 4,021,347, Cl. 210-195.00S.

Tenneco Chemicals, Inc.: *See—*
Chaya, John E.; Bredbenner, Charles; Minnich, Elmer; and Branz, Francis, 4,021,379.

Tenner, Arthur R., to Exxon Research and Engineering Company. Method and apparatus for reducing NO_x from furnaces. 4,021,186, Cl. 431-10.000.

Tenud, Leander, to Lonza Ltd. Process for the production of carnitine. 4,021,480, Cl. 260-534.00M.

Teranishi, Hikaru: *See—*
Ijichi, Ichiro; Kai, Shigetoshi; Teranishi, Hikaru; Morioka, Akira; and Seki, Kazuyoshi, 4,021,391.

Terry, Samuel M., to Hoover Ball and Bearing Company. Foam bed pillow. 4,020,511, Cl. 5-337.000.

Teufel, Helmut: *See—*
Seeger, Ernst; Engel, Wolfhard; Nickl, Josef; and Teufel, Helmut, 4,021,479.

Texaco Development Corporation: *See—*
Brader, Walter H., Jr.; Cuscurida, Michael; and Watts, Lewis W., Jr., 4,021,384.
Cuscurida, Michael; Meyer, Lee G.; and Watts, Lewis W., Jr., 4,021,383.

Texaco Inc.: *See—*
Kudchadker, Mohan V.; Walker, Thad O.; and Schoen, William, 4,021,356.
Morduchowitz, Abraham; Jordan, Terence B.; and Rubin, Isaac D., 4,021,357.
Robin, Allen M.; and Child, Edward T., 4,021,366.

Texas Instruments Incorporated: *See—*
Caudel, Edward R.; and Raymond, Joseph H., Jr., 4,021,656.
Caudel, Edward R., 4,021,781.
Culpepper, Jerry W.; Currie, Harry A.; and Heathcock, William F., 4,021,807.
Kilby, Jack S.; Lathrop, Jay W.; and Porter, Wilbur A., 4,021,323.

Thalmann, Peter: *See—*
Asel, John R.; Allaire, Roger; Thalmann, Peter; and Castonguay, Rene, 4,020,983.

Thate, Kurt: *See—*
Pfeifer, Josef; Rheude, Alfred; Thate, Kurt; and Muller, Jurgen, 4,021,668.

Thelen, Rodney G. Jig fishing apparatus. 4,020,582, Cl. 43-19.200.

Thermal Developments, Inc.: *See—*
Schulte, Milton Robert; and Swartz, George Albert, 4,021,187.

Thies, Alfred, Jr. Apparatus for wet-treating fabrics. 4,020,658, Cl. 68-5.00C.

Thomas, Herbert: *See—*
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,021,571.

Thomas J. Lipton, Inc.: *See—*
Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, 4,020,643.
Thompson, Robert Paul: *See—*
Royce, Martin Robert; and Thompson, Robert Paul, 4,021,588.
Thomson-CSF: *See—*
Auld, Bert A., 4,021,657.
Bossaert, Jean, 4,021,673.
Gilles, Jean-Roger; and Woehrn, Daniel, 4,021,844.
Thuren, John B.; and Tomala, Ambrose, to Bendix Corporation, The. Combined fuel injection and intake valve for electronic fuel injection engine systems. 4,020,803, Cl. 123-32.0VN.
Thuries, Edmond: *See—*
Fournier, Jacques; and Thuries, Edmond, 4,020,860.
Tiffany, John S.: *See—*
Rockett, Thomas J.; Tiffany, John S.; and O'Connell, John J., 4,020,557.
Tile Council of America, Inc.: *See—*
Bernett, Frank E., 4,021,257.
Timochko, Michael J.: *See—*
Kerr, John L.; and Timochko, Michael J., 4,021,814.
Tingskog, Karl August Lennart: *See—*
Eklof, Karl Vilhelm Evert; and Tingskog, Karl August Lennart, 4,020,953.
Tinsley, John M.: *See—*
Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., 4,021,355.
Tippetts, John Russell; and Swithenbank, Joshua, to United Kingdom Atomic Energy Authority. Fluidic flow control devices and pumping systems. 4,021,146, Cl. 417-76.000.
Tirado, William, Jr.: *See—*
Raymond, Leonard; Bockelmann, John B.; and Tirado, William, Jr., 4,021,580.
Tiuri, Martti E.: *See—*
Urpo, Seppo I.; Tallqvist, Henry Stefan; and Tiuri, Martti E., 4,021,810.
TMB Industrial Maintenance Ltd.: *See—*
Rutenberg, Alexander; and Zur, Alexander, 4,021,149.
Toda, Hiromi; Kunimori, Kametaro; and Tsumori, Kuniaki, to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha. Novel cationic amino resins and processes for producing the same. 4,021,484, Cl. 260-567.60P.
Todokoro, Shigeru, to Tokyo Shibaura Electric Co., Ltd. Signal amplifier circuit using a pair of complementary junction field effect transistors. 4,021,747, Cl. 330-13.000.
Todorovic, Vukasin. Orbital motor. 4,021,160, Cl. 418-61.00R.
Tokumoto, Tsunenori: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.
Tokyo Gas Company Limited: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Nakajima, Shunichi; and Hashimoto, Yoshiro, 4,020,616.
Oida, Susumu, 4,021,345.
Todokoro, Shigeru, 4,021,747.
Tomala, Ambrose: *See—*
Thuren, John B.; and Tomala, Ambrose, 4,020,803.
Tomatis, Alfred Ange Auguste. Electronic hearing apparatus. 4,021,611, Cl. 179-1.00N.
Tomatsu, Masanobu: *See—*
Sando, Yoshikazu; Minakata, Matsuo; Ishidoshiro, Hiroshi; Tomatsu, Masanobu; and Kamei, Isao, 4,020,657.
Tomizawa, Kazutaka: *See—*
Kataoka, Shoei; Komamiya, Yasuo; Kawashima, Mitsuo; Hashizume, Nobuo; and Tomizawa, Kazutaka, 4,021,680.
Tomlinson, Seymour W.: *See—*
Richman, Edward B.; Tomlinson, Seymour W.; Nemeth, Suzette; and Wilson, David W., 4,020,842.
Tomoegawa Paper Co., Ltd.: *See—*
Ogiwara, Makoto; Tanaka, Kenichi; Kojima, Yukio; Nakamura, Kohichi; Harazaki, Yuji; Takamizawa, Minoru; Inoue, Yoshio; and Sugita, Toshikazu, 4,020,761.
Tomono, Makoto; Yamakawa, Goiti; Inoue, Akira; and Otsuka, Masahiro, to Konishiroku Photo Industry Co., Ltd. Toner for developing electrostatic latent images. 4,021,358, Cl. 252-62.10P.
Tonka Corporation: *See—*
Cubel, Gerald A., 4,020,587.
Topp, Bernhard: *See—*
Pollner, Rudolf; Friese, Karl-Hermann; Topp, Bernhard; and Neidhard, Horst, 4,021,326.
Torbet, Philip A. Tennis practice machine. 4,021,037, Cl. 273-30.000.
Torquemeters Limited: *See—*
Van Millingen, Reuel Duncan; and Portus, Robert Terence, 4,020,685.
Toshiba Ray-O-Vac Co., Ltd.: *See—*
Naruishi, Tadayuki; Kataoka, Youichi; Sasabe, Haruyoshi; and Tutiya, Satoru, 4,021,598.
Total, Robert V., to Stackpole Machinery Company. High speed labeling machine. 4,021,293, Cl. 156-568.000.
Toth, Istvan; and Prepost, Kalman, to Magyar Vagon- es Gepgyar. Planetary transmission wheel drive mechanism. 4,020,716, Cl. 74-768.000.
Touval, Irving, to M & T Chemicals Inc. Flame retardant compositions. 4,021,406, Cl. 260-45.75B.
Towmotor Corporation: *See—*
Darnell, William E.; and Malecha, Richard J., 4,020,915.
Townsend, Franklin L.; and Govig, Robert L., to Barber-Colman Company. Triaxial weaving machine with flexible passageways for guiding warp strands. 4,020,876, Cl. 139-97.000.
Toyo Kogyo Co., Ltd.: *See—*
Morita, Yasuyuki; and Kodama, Hiroshi, 4,021,163.
Oda, Masamitsu, 4,021,256.
Toyoda, Akira, to Taisan Industrial Co., Ltd. Electromagnetic pump. 4,021,152, Cl. 417-417.000.
Toyomoto, Yoshitaka; and Kawasaki, Noboru, to Yutaka Seiko Kabushiki Kaisha. Chuck for machine tools. 4,021,051, Cl. 279-1.00N.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Ishihara, Tomoo; Sakai, Toshimitsu; and Yamada, Yasufumi, 4,021,712.
Konomi, Toshiaki; Nurita, Joji; and Tanazawa, Yasushi, 4,020,805.
Niimi, Itaru; Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; and Takahashi, Yoshitaka, 4,021,167.
Trask, Burdick S. System for processing and transmitting audio signals received from a television set for reproduction by a high fidelity FM receiver. 4,021,737, Cl. 325-36.000.
Traunecker, Werner: *See—*
Losel, Walter; Traunecker, Werner; and Hoefke, Wolfgang, 4,021,547.
Schromm, Kurt; Mentrup, Anton; Renth, Ernst-Otto; and Traunecker, Werner, 4,021,485.
Trautwein, Wolfgang. Stabilized three-wheeled vehicle. 4,020,914, Cl. 180-25.00R.
Trecek, James Bryant: *See—*
Alexanderson, Verner; Trecek, James Bryant; and Vanderwaart, Cornelius Marsden, 4,021,498.
Treece, William D.: *See—*
Dennis, Ronald E.; Treece, William D.; and Corsmeier, Robert J., 4,020,538.
Treser, Gerhard: *See—*
Lange, Kurt; and Treser, Gerhard, 4,021,541.
Tri W-G, Inc.: *See—*
Weber, Albert J.; Erling, Frank H.; and Bearfield, Clair A., 4,021,028.
Trimco Mfg. & Engineering Inc.: *See—*
Weber, Maurice J., 4,020,930.
Tropicana Products, Inc.: *See—*
Erdman, Frank H., 4,020,949.
True, Howard D. F., Jr.; Merryman, Bob D.; and Gelbard, Robert B., to General Electric Company. Water delivery system and method for forming same. 4,020,644, Cl. 62-340.000.
TRW Inc.: *See—*
Claxton, Dale H., 4,021,743.
Zehren, James N., 4,021,137.
Tsay, Yuh-Geng: *See—*
Kende, Andrew S.; Mills, John E.; and Tsay, Yuh-Geng, 4,021,457.
Tsinober, Leonid Iosifovich: *See—*
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.
Tsubata, Kazuo, to Hirai, Hironori. Method of and apparatus for ending the broken yarn in an open-end spinning system. 4,020,621, Cl. 57-34.00R.
Tsuji, Toshihiko: *See—*
Taniguchi, Yoshisada; Tsuji, Toshihiko; and Oguino, Masanori, 4,021,843.
Tsujimoto, Kayoshi; and Matsui, Toru, to Minolta Camera Kabushiki Kaisha. Electrically controlled shutter. 4,021,822, Cl. 354-31.000.
Tsukiyasu, Tadashi: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,021,315.
Tsumori, Kuniaki: *See—*
Toda, Hiromi; Kunimori, Kametaro; and Tsumori, Kuniaki, 4,021,484.
Tsunoda, Yoshito: *See—*
Takeda, Yasutsugu; Tsunoda, Yoshito; Imagawa, Fumio; Kataoka, Keiji; and Tatsuno, Kimio, 4,021,606.
Tsyganov, Evgeny Matveevich: *See—*
Khadzhi, Valentin Evstafievich; Tsyganov, Evgeny Matveevich; Tsinober, Leonid Iosifovich; Novozhilova, Zhanneta Viktorovna; Reshetova, Galina Vasilievna; Samoilovich, Mikhail Isaakovich; Butuzov, Vladimir Petrovich; Shaposhnikov, Anatoly Alexandrovich; and Lelekova, Margarita Vladimirovna, 4,021,294.
Tucker, Robert Jerome; and Greenwood, Ruth, to American Cyanamid Company. Polymer substrates coated with stabilized polymeric coating composition. 4,021,405, Cl. 260-45.80R.
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., to Nalco Chemical Company. Continuous process for the preparation of a cationically modified acrylamide polymer. 4,021,394, Cl. 260-29.4UA.
Tungler, Antal: *See—*
Petro, Jozsef; Mathe, Tibor; and Tungler, Antal, 4,021,371.

Petro, Jozsef; Mathe, Tibor; Tungler, Antal; and Csuros, Zoltan, 4,021,374.
Tuppy, Hans: *See—*
Cullen, Ernest; Meindl, Peter; Tuppy, Hans; and Bodo, Gerhard, 4,021,551.
Turek, Klaus; Schumacher, Martin; and Zimmermann, Richard. Process and apparatus for separation of solvents from an air stream laden with solvent vapors. 4,021,211, Cl. 55-18.000.
Turner, Charles L., to General Refractories Company. Extrusion die and cutting tool for machining such a die. 4,021,134, Cl. 408-204.000.
Turner, James R.: *See—*
Kern, Richard A.; McClung, Carl L.; and Turner, James R., 4,020,809.
Tutiya, Satoru: *See—*
Naruishi, Tadayuki; Kataoka, Youichi; Sasabe, Haruyoshi; and Tutiya, Satoru, 4,021,598.
Tyler, Truman V. Water purifier. 4,021,343, Cl. 210-110.000.
Tyrolit-Schleifmittelwerk Swarovski K.G.: *See—*
Oberbichler, Werner, 4,021,208.
Uchida, Tohru: *See—*
Kamogawa, Nin-ichi; and Uchida, Tohru, 4,021,709.
Uchiyama, Takashi; Mashimo, Yukio; Nakamura, Zenzo; and Sugiura, Yoji, to Canon Kabushiki Kaisha. Flash light photographic system for camera. 4,021,824, Cl. 354-33.000.
Uchiyama, Takashi: *See—*
Iura, Yukio; Yamamichi, Masayoshi; Uchiyama, Takashi; Taguchi, Tetsuya; and Mashimo, Yukio, 4,021,828.
Uddeholms Aktiebolag: *See—*
Johnsson, Mans Klas Olof; and Eriksson, Lars Anders, 4,021,233.
Ueda, Hirotada; Uno, Takeshi; and Ikeda, Sadahiro, to Hitachi, Ltd. Pattern recognition system. 4,021,778, Cl. 340-146.3AC.
Ueda, Yuji: *See—*
Hosaka, Hirokazu; Tanaka, Kunihiko; and Ueda, Yuji, 4,021,495.
Uegai, Yoshiaki: *See—*
Fujii, Setsuro; Uegai, Yoshiaki; Watanabe, Tsuyoshi; and Kayama, Naohiro, 4,021,472.
Ueno, Eichiro; Kawasaki, Hideo; and Shigita, Shozo, to American Cyanamid Company. Process for printing fiber products of acrylic fiber blends. 4,021,196, Cl. 8-21.00A.
Ueshima, Takashi; Tanaka, Yasuzi; Yokoyama, Toshiro; and Kobayashi, Shoichi, to Showa Denko Kabushiki Kaisha. Cyano-substituted norbornene polymers blended with polyvinyl chloride resins. 4,021,510, Cl. 260-891.000.
Ugine Aciers: *See—*
Besson, Paul; Guerin, Jean; Brun, Pierre; and Bakes, Michel, 4,021,531.
Ukai, Toshinao: *See—*
Noguchi, Yasuhiro; Ukai, Toshinao; Sashihara, Kenji; and Masuda, Takao, 4,021,249.
Ulanski, Lawrence J.: *See—*
Louis, Charles R.; and Ulanski, Lawrence J., 4,020,960.
Ullman, Thomas James, to Zenith Carburetor Company Limited, The. Carbureters. 4,021,513, Cl. 261-50.00A.
Union Carbide Corporation: *See—*
Harbuck, Linda Ann, 4,021,476.
Szekely, Andrew Geza, 4,021,026.
United Kingdom Atomic Energy Authority: *See—*
Tippetts, John Russell; and Swithenbank, Joshua, 4,021,146.
U.S. Industries, Inc.: *See—*
Belanger, Wilfred E., 4,021,072.
United States of America
Agriculture: *See—*
Dufek, Edward J., 4,021,462.
Soper, Richard S., Jr., 4,021,306.
Air Force: *See—*
Andrews, Austin M., II; Clarke, John E.; Gertner, Edward R.; Longo, Joseph T.; and Eden, Richard C., 4,021,836.
Arnold, Fred E., 4,021,409.
Braunschweig, Ernie D.; and Wilson, Robert E., 4,021,753.
Channell, Ronald E.; and O'Pray, John E., 4,021,362.
Chernick, Leon, 4,021,801.
Kirby, Paul J.; and Gardner, Edward M., 4,021,785.
Mimms, Vernon, 4,021,662.
Schell, Allan C.; and Mailloux, Robert J., 4,021,812.
Army: *See—*
Boriss, Robert P., 4,021,806.
Campi, Morris, 4,021,759.
Campi, Morris, 4,021,760.
Epstein, Arnold S.; Share, Stewart; and Polimadei, Roland A., 4,021,834.
Glass, Coy M., deceased; and Dante, James G., 4,020,765.
Kerr, John L.; and Timochko, Michael J., 4,021,814.
Nix, Andrew B., 4,020,723.
Piotrowski, Casimir F.; Scidmore, Wright H.; O'Shaughnessy, Robert P.; Marasco, Nicholas P.; Cerrato, Louis R.; and Haines, Clarence C., Jr., 4,020,739.
Van Atta, Peter W., 4,021,847.
Energy Research and Development Administration: *See—*
Ahlgren, Frederic F.; and Scott, Paul F., 4,020,693.
Arave, Alvin E., 4,020,692.
Duffy, James B., 4,021,676.
Hall, James E.; and Williams, Everett H., 4,021,021.
Marshall, John; and Kaplan, Samuel, 4,021,300.
Rinde, James A.; and Fulton, Fred J., 4,021,280.
Valentine, Kenneth H.; Long, Ernest L., Jr.; and Willey, Melvin G., 4,021,669.
General Counsel-Code GP: *See—*
Coffinberry, George A.; and Kast, Howard B., 4,020,632.
Navy: *See—*
Black, Lawrence M.; Jackson, Egbert H., Jr.; and Bilow, Henry J., 4,021,813.
Doddington, Harold W.; and Sheppard, Donald M., 4,020,677.
Kirkland, James L., 4,021,725.
Petersen, Robert, 4,020,736.
Roese, John A., 4,021,846.
Shumaker, Richard K.; and Harris, William G., Jr., 4,020,780.
U.S. Philips Corporation: *See—*
Camerik, Eduard, 4,021,101.
Czonka, Viktor; and Patlik, Alois, 4,021,855.
Dragt, Jan Cornelis Willem, 4,021,096.
Von Hacht, Reinhard; Rennicke, Klaus; and Schmedemann, Walter, 4,021,715.
United States Steel Corporation: *See—*
Pringle, William L., 4,020,512.
Pringle, William L., 4,021,077.
United Technologies Corporation: *See—*
Dettling, Joseph R., 4,021,267.
Lopiccolo, Mario T.; Schaffer, Max A.; and Jachyra, George A., 4,020,700.
Rosenbush, Fred M.; and Telakowski, Robert, 4,021,215.
Schaffer, Max A., 4,020,699.
Slaughter, Edward R., 4,020,542.
Violette, John A., 4,021,142.
Universal Instruments Corporation: *See—*
Bates, Erwin Frederick; and Whiting, Roy Marvin, 4,021,292.
Orzelek, Frank J.; and Whiting, Roy M., 4,021,289.
Universal Manufacturing Corporation: *See—*
DeMauro, Armand A., 4,021,000.
Miller, Fredric S., 4,020,727.
Universal Oil Products Company: *See—*
Christensen, Nils J., 4,021,381.
University of California, The Regents of the: *See—*
Lee, Kwan-Hua, 4,021,573.
University of Utah, The: *See—*
Johnson, Curtis C.; Moss, Stanley D.; and Janata, Jiri A., 4,020,830.
Uno, Takeshi: *See—*
Ueda, Hirotada; Uno, Takeshi; and Ikeda, Sadahiro, 4,021,778.
Uogaeshi, Shinobu, to Teijin Limited. Concrete structure and method of preparing same. 4,021,258, Cl. 106-99.000.
UOP Inc.: *See—*
Bieser, Herbert J., 4,021,499.
Upjohn Company, The: *See—*
Bundy, Gordon L., 4,021,467.
Hester, Jackson B., Jr., 4,021,441.
Onder, Besir K., 4,021,412.
Schlieckmann, Alfred, 4,021,173.
White, David R., 4,021,478.
Upton, Albert E.; and McKee, Donald S., to Scott & Fetzer Company, The. Retractable awning. 4,020,888, Cl. 160-66.000.
Urakawa, Chikahiro: *See—*
Fujimoto, Yasuo; Nakano, Kinichi; and Urakawa, Chikahiro, 4,021,449.
Urayama, Ken-Ichi: *See—*
Morii, Kokichi; and Urayama, Ken-Ichi, 4,021,761.
Urgos Uhrenfabrik Schwenningen a.N. Haller, Jauch und Pabst: *See—*
Steinle, Gerhart; and Rossmann, Siegfried, 4,020,624.
Urogdi, Laszlo: *See—*
Kisfaludy, Lajos; Rohricht, Julianna; Urogdi, Laszlo; Szeberenyi, Szabolcs; Palosi, Eva; and Szporny, Laszlo, 4,021,421.
Urpo, Seppo I.; Tallqvist, Henry Stefan; and Tiuri, Martti E. Travelling wave meander conductor antenna. 4,021,810, Cl. 343-731.000.
Ushakov, Anatoly Georgievich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.
Ushitani, Kenji: *See—*
Niimi, Itaru; Hashimoto, Kametaro; Ushitani, Kenji; Shibata, Masashi; and Takahashi, Yoshitaka, 4,021,167.
Uskokovic', Milan Radoje: *See—*
Baggiolini, Enrico; Partridge, John Joseph, Jr.; and Uskokovic', Milan Radoje, 4,021,423.
Valdespino, Joseph M., to Gould, R. L.; and Hobbs, Stanley, part interest to each. Well point system. 4,020,902, Cl. 166-52.000.
Valentine, James R.: *See—*
Field, Edwin L.; Lamantia, Charles R.; Lunt, Richard R.; Oberholtzer, James E.; and Valentine, James R., 4,021,202.
Valentine, Kenneth H.; Long, Ernest L., Jr.; and Willey, Melvin G., to United States of America, Energy Research and Development Administration. Nuclear fuel microsphere gamma analyzer. 4,021,669, Cl. 250-328.000.
Vallino, Barney: *See—*
Hunter, Wood E.; and Vallino, Barney, 4,021,399.
Van Atta, Peter W., to United States of America, Army. Compensation circuit for pyroelectric vidicon system. 4,021,847, Cl. 358-113.000.
van den Heuvel, Eeuwoud; and Reinhold, Huibert Peter, to Vlisco B.V.

Method and apparatus for marking a web. 4,020,759, Cl. 101-328.000.

van der Lely, Cornelis. Haymaking machines. 4,020,620, Cl. 56-370.000.

van de Rovaart, Paul: *See—*
Wuhrmann, Jean-Jacques; and van de Rovaart, Paul, 4,021,175.

van der Velden, Josephus Hendrikus Maria: *See—*
Radstake, Herman; De Jong, Gerrit; and van der Velden, Josephus Hendrikus Maria, 4,021,309.

Vanderwaart, Cornelius Marsden: *See—*
Alexanderson, Verner; Trecek, James Bryant; and Vanderwaart, Cornelius Marsden, 4,021,498.

Vangbo, Hakan, to Aktiebolaget Carl Munters. Method of manufacturing a contact body. 4,021,590, Cl. 428-186.000.

Van Hille, Herman. Live bottom pit for a solid waste disposal system. 4,020,956, Cl. 214-17.0DA.

Van Millingen, Reuel Duncan; and Portus, Robert Terence, to Torquemeters Limited. Phasemeters. 4,020,685, Cl. 73-136.00A.

Van Poucke, Raphael Karel: *See—*
Van Wijnsberghe, Leo August; and Van Poucke, Raphael Karel, 4,021,445.

Van Scott, Eugene J.; and Yu, Ruey J. Prophylactic and therapeutic treatment of acne vulgaris utilizing lactamides and quaternary ammonium lactates. 4,021,572, Cl. 424-317.000.

Van Scott, Eugene J.: *See—*
Yu, Ruey J.; and Van Scott, Eugene J., 4,021,538.

Van Vloten, Curtis P., to Arthur D. Little, Inc. Liquid printing device. 4,021,818, Cl. 346-140.00R.

Van Wijk, Jozef Carolus: *See—*
Pira, Francois Jean; and Van Wijk, Jozef Carolus, 4,021,179.

Van Wijnsberghe, Leo August; and Van Poucke, Raphael Karel, to AGFA-GEVAERT N.V. Preparation of 4-monhohalo-2-pyrazolin-5-on-compounds. 4,021,445, Cl. 260-310.00A.

Vary, Eva M., to Du Pont de Nemours, E. I., and Company. Aqueous dispersion of an aryloxysulfone copolymer. 4,021,395, Cl. 260-29.20R.

Vassie, John McLauchlan: *See—*
Rawcliffe, John; and Vassie, John McLauchlan, 4,021,724.

Vautrain, Lucien H.; and Ems, Herbert A., to Phillips Petroleum Company. Control system for sulfur process. 4,021,201, Cl. 23-253.00A.

VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen: *See—*
Fichte, Frank; and Paul, Wolfgang, 4,021,030.
Fichte, Frank; and Paul, Wolfgang, 4,021,710.

Veerhoff, Peter: *See—*
Nordstrom, Cai Gustav Rabbe; and Veerhoff, Peter, 4,020,835.

Velasquez, Robert L. Toothbrush. 4,020,521, Cl. 15-172.000.

Velsicol Chemical Corporation: *See—*
Krenzer, John, 4,021,439.

Ventur-E, Inc. of Richmond: *See—*
LaForce, Edward P., 4,020,811.

Verdol S.A.: *See—*
Sage, Paul, 4,020,774.

Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft: *See—*
Bartel, Franz; and Dub, Karl, 4,020,703.
Sigott, Siegfried; Zitz, Alfred; and Suessenbeck, Heinrich, 4,020,640.

Verschuur, Eke: *See—*
Huberts, Leo J. Th. J.; and Verschuur, Eke, 4,021,206.

Vickery, Ian Malcolm. Throat pack. 4,020,844, Cl. 128-303.00R.

Videocolor S.A.: *See—*
Chase, Thomas Louis; Duranti, Dino; and Sassoli, Renato, 4,021,820.

Vieweg-Gutberlet, Fritz; and Siegesleitner, Peter, to Wacker-Chemitronic Gesellschaft fur Elektronik Grundstoffe mbH. Method and apparatus for making a metal to semiconductor contact. 4,021,735, Cl. 324-158.00P.

Vinal, Richard Sturtevant: *See—*
Wadsworth, Donald Harold; and Vinal, Richard Sturtevant, 4,021,475.

Vinals, Joaquin F.: *See—*
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, 4,021,494.

Violette, John A., to United Technologies Corporation. Pitch-change apparatus for a ducted thrust fan. 4,021,142, Cl. 416-167.000.

Virgilio, Joseph A.; and Manowitz, Milton, to Givaudan Corporation. Formamidines useful as ultraviolet light absorbers. 4,021,471, Cl. 260-471.00R.

Vitjuk, Viktor Ivanovich: *See—*
Shulzhenko, Alexandr Alexandrovich; Vitjuk, Viktor Ivanovich; and Maslenko, Jury Savvich, 4,021,171.

Vittoz, Eric A., to Centre Electronique Horloger S.A. Automatic regulation of an electronic watch. 4,020,628, Cl. 58-145.00K.

Vivitronics Corporation: *See—*
Sweeton, Gerard F., 4,021,042.

Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; by Lenkova, Evdokia Mikhailovna, administrator; and by Lenkova, Nina Karlovna, administrator. Tires reinforced with steel cord. 4,020,887, Cl. 152-359.000.

Vlisco B.V.: *See—*
van den Heuvel, Eeuwoud; and Reinhold, Huibert Peter, 4,020,759.

Vock, Manfred Hugo: *See—*
Hall, John B.; Sprecker, Mark A.; Schmitt, Frederick Louis; and Vock, Manfred Hugo, 4,021,488.
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, 4,021,494.

Volkov, Anatoly Ivanovich: *See—*
Gubsky, Alexei Alexeevich; Borisevich, Vladimir Karpovich; Volkov, Anatoly Ivanovich; and Molchanjuk, Valery Matveevich, 4,020,663.

Von Hacht, Reinhard; Rennicke, Klaus; and Schmedemann, Walter, to U.S. Philips Corporation. Motor drive for the displacement of a section of an X-ray examination apparatus. 4,021,715, Cl. 318-628.000.

von Walter, Alfred, to Steigerwald Strahltechnik GmbH. Beam current control device for a technical corpuscular beam apparatus. 4,021,636, Cl. 219-121.0EB.

Vossos, Peter H.: *See—*
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., 4,021,394.

Vrolyk, John J., to Rockwell International Corporation. High pressure, high temperature transducer. 4,020,696, Cl. 73-412.000.

Vroman, William R., to Chrysler Corporation. Catalytic reactor for automobile. 4,020,539, Cl. 29-157.00R.

Vukolov, Dmitri Dmitrievich: *See—*
Slavinski, Ivan Assenov; Angelov, Todor Dimitrov; Vukolov, Dmitri Dmitrievich; Burgudjiev, Eduard Todorov; and Komitovski, Mihail Dimitrov, 4,020,545.

Vulovic, Radoje, to Sun Shipbuilding and Dry Dock Company. Ship loading ramp. 4,020,954, Cl. 214-15.00R.

Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi: *See—*
Spisiak, Juraj; Jansa, Milos; Bezdek, Miloslav; and Ferdus, Stanislav, 4,020,877.

W. R. Grace & Co.: *See—*
Wszolek, Walter R., 4,020,966.

Wacker-Chemitronic Gesellschaft fur Elektronik Grundstoffe mbH: *See—*
Vieweg-Gutberlet, Fritz; and Siegesleitner, Peter, 4,021,735.

Wada, Hisayuki: *See—*
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, 4,021,390.

Waddell, Robert E. Dockboard. 4,020,517, Cl. 14-71.500.

Wadsworth, Donald Harold; and Vinal, Richard Sturtevant, to Eastman Kodak Company. Synthesis of aryl ethers of bis(hydroxymethyl) ether. 4,021,475, Cl. 260-491.000.

Wagner, Erich: *See—*
Ahrens, Gunter; Hesse, Hans Hermann; Beierfuss, Gunter; and Wagner, Erich, 4,020,531.

Wagner, Ernest W., to Caterpillar Tractor Co. Pivoted scraper ejector with hydraulic means to provide level spread. 4,020,574, Cl. 37-126.0AE.

Wagner, Vilma M.: *See—*
Cuttill, William E.; and Wagner, Vilma M., 4,020,536.

Walker, George Brown: *See—*
Fechter, Harry Robert; and Walker, George Brown, 4,020,674.

Walker, Thad O.: *See—*
Kudchadker, Mohan V.; Walker, Thad O.; and Schoen, William, 4,021,356.

Walliser, Roland: *See—*
Carbonell, Jose; Hasler, Rolf; and Walliser, Roland, 4,020,998.

Walsh, Dale M.: *See—*
Harris, Harvey H.; Lindberg, Victor; and Walsh, Dale M., 4,021,654.

Walter Sarstedt Kunststoff-Spritzgusswerk: *See—*
Sarstedt, Walter, 4,021,352.

Walters, Robert A.; and Hirtz, Russell E., to ARCO Medical Products Company. Circuit for measuring the refractory period of a heart pacer. 4,021,736, Cl. 324-181.000.

Walworth, Bryant Leonidas: *See—*
Cross, Barrington; Grasso, Charles Paul; and Walworth, Bryant Leonidas, 4,021,227.

Walworth, Vivian K.: *See—*
McCann, John J.; McCann, Mary A.; Plummer, William T.; Seiden, Myron A.; and Walworth, Vivian K., 4,021,825.

Wang, Samuel S., to American Cyanamid Company. Mar-resistant coating composition of reaction product of hydroxy-terminated urethane and melamine resin. 4,021,505, Cl. 260-856.000.

Wang, Shing Chung, to Xerox Corporation. Laser for generating white light. 4,021,845, Cl. 358-75.000.

Ward, Albert John Clark: *See—*
Slatter, John Reginald; Jackson, James Albert; Brooks, John Gedny; Ward, Albert John Clark; and Dewhurst, Alan, 4,020,926.

Warkentin, Ulrich: *See—*
Saufferer, Manfred; Spauszus, Siegfried; and Warkentin, Ulrich, 4,021,645.

Warnecke Electron Tubes, Inc.: *See—*
Doehler, Oskar; Dohler, Gunter; and Friz, Walter, 4,021,697.

Warner, Charles E.: *See—*
Myers, Felix E.; Ball, Kenneth D.; Michetti, Anthony; and Warner, Charles E., 4,021,632.

Warren, Alfreda C.: *See—*
Warren, McCoy; and Warren, Alfreda C., 4,020,513.

Warren, McCoy; and Warren, Alfreda C., to Raymond Lee Organiza-

tion, Inc., The, a part interest. Combination luggage carrier and picnic table for use with rowboats. 4,020,513, Cl. 9-1.500.
Warwick, William Arthur, to International Business Machines Corporation. Semiconductor integrated circuit devices. 4,021,838, Cl. 357-68.000.
Watanabe, Akio: *See*—
Kiritani, Masataka; Matsukawa, Hiroharu; Watanabe, Akio; and Imamiya, Hitoshi, 4,021,595.
Watanabe, Hiroshi: *See*—
Onoda, Hajime; and Watanabe, Hiroshi, 4,020,689.
Watanabe, Muneo, to Yamamura Glass Kabushiki Kaisha. Chemical method of strengthening glass articles subjected to abrasion resistance treatment. 4,021,218, Cl. 65-30.00E.
Watanabe, Tsuyoshi: *See*—
Fujii, Setsuro; Uegai, Yoshiaki; Watanabe, Tsuyoshi; and Kayama, Naohiro, 4,021,472.
Waterman, David Charles Alexander: *See*—
Dyer, Peter; and Waterman, David Charles Alexander, 4,021,501.
Waters, Percy Lloyd, to Commonwealth Scientific and Industrial Research Organization. Spouted-fluidized bed reactor systems. 4,021,193, Cl. 432-58.000.
Wathen, Tom M.: *See*—
Conrad, Daniel T.; Mast, William C.; and Wathen, Tom M., 4,021,504.
Watkins, William B. Power driven fishing reel. 4,021,003, Cl. 242-84.10A.
Watson, Kenneth, to Westland Aircraft Limited. Semi-rigid rotors for rotary wing aircraft. 4,021,141, Cl. 416-141.000.
Wattimena, Freddy: *See*—
Wulff, Harald P.; and Wattimena, Freddy, 4,021,454.
Watts, Lewis W., Jr.: *See*—
Brader, Walter H., Jr.; Cuscurida, Michael; and Watts, Lewis W., Jr., 4,021,384.
Cuscurida, Michael; Meyer, Lee G.; and Watts, Lewis W., Jr., 4,021,383.
Webb, Michael Guthrie, to British Petroleum Company Limited, The. Oil pick up device. 4,021,344, Cl. 210-122.000.
Weber, Albert J.; Erling, Frank H.; and Bearfield, Clair A., to Tri W-G, Inc. Tiltable treatment table. 4,021,028, Cl. 269-325.000.
Weber, Maurice J., to Trimco Mfg. & Engineering Inc. Double action brief case. 4,020,930, Cl. 190-51.000.
Weber, Robert, to Siemens Aktiengesellschaft. Nuclear reactor installation containment construction. 4,021,297, Cl. 176-30.000.
Webster, Ronald L. Method and stuttering therapy apparatus. 4,020,567, Cl. 35-35.00C.
Webster, Samuel John: *See*—
Fielding, Harold Crosbie; Hutchinson, John; and Webster, Samuel John, 4,020,903.
Wegewijs, Hendrik Franciscus; and Wolters, Tjako Aaldrik, to Ballast-Nedam Group N.V. Method and device for sucking up a solid substance from a stock. 4,020,573, Cl. 37-63.000.
Wehren, Peter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Sieve with drive. 4,021,337, Cl. 209-329.000.
Weikert, Roy J. Method of making aseptic packaging. 4,021,283, Cl. 156-244.000.
Weiner, Jerold Samuel: *See*—
Freimuth, Gerhart William; and Weiner, Jerold Samuel, 4,020,750.
Weinger, Ralph. Color video synthesizer with improved image control means. 4,021,841, Cl. 358-22.000.
Weinstein, Jack: *See*—
Berghahn, Walter G.; and Weinstein, Jack, 4,021,125.
Weisbrich, Alfred L. Variable geometry windturbine. 4,021,140, Cl. 416-117.000.
Weislehner, Gustav, to Portlandzementwerk Dotternhausen Rudolf Rohrbach KG. Installation for the de-dusting of hot gases. 4,021,194, Cl. 432-78.000.
Weiss, Frank: *See*—
Horn, Peter; Teege, Gernot; Fliege, Werner; Weiss, Frank; and Meissner, Bernd, 4,021,408.
Weiss, Max, to Strapex AG. Band clamping device for a machine wrapping a band, strip or the like about piece goods or the like. 4,020,756, Cl. 100-26.000.
Welch, William T., to Smith Pipe and Steel Co. Lintel structure. 4,020,612, Cl. 52-731.000.
Wellen Industries: *See*—
Ludt, Roy R.; Eggert, Carl A.; and Skarman, John, 4,021,792.
Wells, Leslie H., to Raymond Lee Organization, Inc., The, a part interest. Garden marker. 4,020,906, Cl. 172-350.000.
Welstead, William J., Jr.; and Boswell, Robert F., Jr., to A. H. Robins Company, Incorporated. 10-[ω-(benzoylpiperidinyl)alkyl]phenothiazines. 4,021,552, Cl. 424-247.000.
Welty, Richard K.; Robinson, Dan L.; and Deveraux, Harry R., to Exxon Nuclear Company, Inc. Fuel rod pressurization. 4,020,673, Cl. 73-37.000.
Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See*—
Daume, Eduard, 4,021,514.
West Electric Company, Ltd.: *See*—
Iwata, Hiroshi; and Ishikawa, Katsuji, 4,021,826.
West, Robert E., to Cascade Industries, Incorporated. Combination wood and aluminum swimming pool wall structure. 4,020,509, Cl. 4-172.190.
Westbrook, Gregory Lee: *See*—
Dounce, Eric Alexander; and Westbrook, Gregory Lee, 4,021,804.
Western Electric Co.: *See*—
Fuchs, Francis Joseph, Jr.; and Shaffer, John Richard, 4,021,156.
Western Electric Company, Inc.: *See*—
Cho, Kon Ho; and Parry, Peter David, 4,021,276.
Dafter, Robert Vincent, Jr., 4,021,314.
Pohl, Herbert Adolf, 4,020,548.
Westinghouse Air Brake Company: *See*—
Gill, Raymond E., 4,020,933.
Westinghouse Brake & Signal Company Limited: *See*—
Roachsmith, Humphrey, 4,021,723.
Westinghouse Electric Corporation: *See*—
Gary, Wardell; Taylor, Glenn R.; and Kimmel, Donald S., 4,021,703.
Jones, Andrew R., 4,021,298.
Kimblin, Clive W., 4,021,628.
Sabino, Frank, Jr., 4,021,136.
Scalzo, Augustine J.; and Gunderlock, Richard P., 4,021,138.
Westland Aircraft Limited: *See*—
Watson, Kenneth, 4,021,141.
Weston, George Oliver, to John Wyeth & Brother Limited. Process for preparing N-phenylcarbamates. 4,021,469, Cl. 260-471.00C.
Westphal, James A.: *See*—
Fort, J. Robert; Westphal, James A.; and Juilfs, Donald R., 4,021,649.
Weyermann, Heinz. Methods and apparatus for the preparation of pale malt. 4,020,562, Cl. 34-12.000.
Wheelabrator-Frye, Inc.: *See*—
Bergh, John C., 4,020,596.
Wheeler, Robert C., to GTE Sylvania Incorporated. Television receiver raster blanking system. 4,021,849, Cl. 358-165.000.
Wheeler, Robert Charles: *See*—
Srivastava, Gopal Krishna; and Wheeler, Robert Charles, 4,021,848.
Wheeler, Robert R. Bulk material container loading and system. 4,020,958, Cl. 214-41.00R.
White, Alan Chapman; and Franklin, Richard Arthur, to John Wyeth & Brother Limited. Hexahydroazepines as antiinflammatory agents. 4,021,550, Cl. 424-244.000.
White, David R., to Upjohn Company, The. Preparation of carboxylic acids from glycidonitriles with ionic lewis acids. 4,021,478, Cl. 260-515.00R.
White, Donald A., to Monsanto Company. Electrolytic preparation of phosphorous acid from elemental phosphorus. 4,021,321, Cl. 204-103.000.
Whitehead & Kales Company: *See*—
DeShetler, Louis K., 4,020,630.
Whiteley, Eric, to Canadian General Electric Company Limited. Peripheral commutator for discoidal armature. 4,021,692, Cl. 310-237.000.
Whiting, Roy M.: *See*—
Orzelek, Frank J.; and Whiting, Roy M., 4,021,289.
Whiting, Roy Marvin: *See*—
Bates, Erwin Frederick; and Whiting, Roy Marvin, 4,021,292.
Whyman, Richard David: *See*—
Brown, Kenneth Robson; Holmes, James; and Whyman, Richard David, 4,020,701.
Wick, Alexander Eduard: *See*—
Fischli, Albert Eduard; Klaus, Michael Josef; Mayer, Hans Johann; and Wick, Alexander Eduard, 4,021,446.
Widdig, Arno: *See*—
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,021,571.
Wiedman, Steven John: *See*—
Cooke, Anson Richard; Long, John Whitney; and Wiedman, Steven John, 4,021,230.
Wiersma, Alva J., to Raymond Lee Organization, Inc., The, a part interest. Book holding device. 4,021,013, Cl. 248-453.000.
Wieske, Reinhold: *See*—
Arnold, Hanfried; Hilscher, Jean-Claude; and Wieske, Reinhold, 4,021,458.
Wiggins, Richard F., to Gyromat Corporation, The. Pressure vessel for voltage block material supply system. 4,020,866, Cl. 137-592.000.
Wildman, Claude L.; and Hellmer, George A., to Kummerer, Richard A.; and Den Besten, Alfred, part interest to each. Link for pintle chain. 4,020,631, Cl. 59-90.000.
Wildt Mellor Bromley Limited: *See*—
Savage, Sidney Clifford, 4,020,652.
Wiley, Emmett H., to General Electric Company. Projector lamp reflector. 4,021,659, Cl. 240-41.360.
Willard, David Frank: *See*—
Sharp, Ronald Edward; and Willard, David Frank, 4,021,653.
Willey, Melvin G.: *See*—
Valentine, Kenneth H.; Long, Ernest L., Jr.; and Willey, Melvin G., 4,021,669.
Willi, Hans Anton. Device providing improved support of the lower leg of a skier. 4,021,053, Cl. 280-11.360.
Williams, Charles H., to Koppers Company, Inc. Apparatus for inspecting and sorting buttons. 4,020,950, Cl. 209-73.000.
Williams, Everett H.: *See*—
Hall, James E.; and Williams, Everett H., 4,021,021.
Willis, Michael John: *See*—
Roberts, Clive Arnold; Scott nee Reid, Jennifer Joan; and Willis, Michael John, 4,020,643.
Willis, Roland George: *See*—
Cerquone, Felice Mary; Gabrielsen, Rolf Steven; and Willis, Roland George, 4,021,240.
Willson, James K. V.; and Eskridge, Marshall. Spring guide wire with

torque control for catheterization of blood vessels and method of using same. 4,020,829, Cl. 128-2.00M.
Willyard, John J., to Ford Motor Company. Universal joint seal. 4,021,085, Cl. 308-187.200.
Wilmot Engineering Company: *See—*
Wilmot, George L.; and Redding, James A., 4,020,629.
Wilmot, George L.; and Redding, James A., to Wilmot Engineering Company. Solid side bar rivetless chain. 4,020,629, Cl. 59-85.000.
Wilson, Charles D., to Xerox Corporation. Photoreceptor dark current leakage detecting apparatus for xerographic machines. 4,021,112, Cl. 355-14.000.
Wilson, David W.: *See—*
Richman, Edward B.; Tomlinson, Seymour W.; Nemeth, Suzette; and Wilson, David W., 4,020,842.
Wilson, Inez F. Safety umbrella. 4,020,858, Cl. 135-20.00R.
Wilson, Maurice D.: *See—*
Bravence, Benjamin M.; and Wilson, Maurice D., 4,020,589.
Wilson, Michael S.: *See—*
Cuneo, Edward A.; Kato, Makoto; and Wilson, Michael S., 4,020,535.
Wilson, Robert C., Jr.; and Schwartz, Albert B., to Mobil Oil Corporation. Hydrocarbon conversion over activated erionite. 4,021,332, Cl. 208-120.000.
Wilson, Robert E.: *See—*
Braunschweig, Ernie D.; and Wilson, Robert E., 4,021,753.
Windish, Willis E., to Caterpillar Tractor Co. Geared steer transmission. 4,020,932, Cl. 192-4.00A.
Winn, Oliver H., to General Electric Company. Sheet-wound transformer coils with reduced edge heating. 4,021,764, Cl. 336-84.000.
Winter, Rudolph Richard, to Borg-Warner Corporation. Fabricated clutch pressure plate. 4,020,937, Cl. 192-107.00R.
Wisconsin Alumni Research Foundation: *See—*
Harkin, John M., 4,021,338.
Suttie, John W., 4,021,568.
Wittig, Christoph M.: *See—*
Schmitz, Reinold; and Wittig, Christoph M., 4,021,455.
Wittmann, Otto: *See—*
Eisele, Wolfgang; Petersen, Harro; Mayer, Johann; and Wittmann, Otto, 4,021,413.
Witzel, John Richard: *See—*
Losey, Jerry Earl; Witzel, John Richard; and Kauffman, Harry Dean, 4,021,635.
Woehrn, Daniel: *See—*
Gilles, Jean-Roger; and Woehrn, Daniel, 4,021,844.
Wolk, Ronald H., to Electric Power Research Institute Inc. Solidfying solvent refined coal. 4,021,328, Cl. 208-8.000.
Wollweber, Hartmund: *See—*
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,021,571.
Wolters, Tjako Aaldrik: *See—*
Wegewijs, Hendrik Franciscus; and Wolters, Tjako Aaldrik, 4,020,573.
Won, Lee Chun. Tennis ball storage container. 4,020,948, Cl. 206-315.00B.
Wood, Donald C.: *See—*
McLaughlin, Robert L.; and Wood, Donald C., 4,021,360.
Wood Industries, Inc.: *See—*
Bryer, Jack, 4,020,760.
Wood, Nyal B., to FMC Corporation. Fruit feeding apparatus. 4,020,943, Cl. 198-445.000.
Woollard, Gary A., to Borg-Warner Corporation. Drive system. 4,020,711, Cl. 74-230.17E.
Work Wear Corporation: *See—*
Rice, George A., 4,021,029.
Wouk, Victor: *See—*
Rosen, Charles; and Wouk, Victor, 4,021,677.
Wren, Eugene Wilson. Detachable truck bed extension and loading ramp. 4,020,957, Cl. 214-38.00R.
Wright, Roger L., to Eastman Kodak Company. Process for the purification of neopentyl glycol. 4,021,496, Cl. 260-637.00P.
Wszolek, Walter R., to W. R. Grace & Co. Plastisol composition and container closure gasket made therefrom. 4,020,966, Cl. 215-349.000.
Wu, Souheng, to Du Pont de Nemours, E. I., and Company. Aqueous coating composition of an acrylic polymer having reactive sites and an epoxy resin. 4,021,396, Cl. 260-29.6NR.
Wuhrmann, Jean-Jacques; and van de Rovaart, Paul, to Societe d'Assistance Technique pour Produits Nestle S.A. Extrusion device. 4,021,175, Cl. 425-191.000.
Wulff, Harald P.; and Wattimena, Freddy, to Shell Oil Company. Olefin epoxidation. 4,021,454, Cl. 260-348.50L.
Wurst, Walter Kenneth, to International Standard Electric Corporation. Intra link calling within a subscriber digital system. 4,021,618, Cl. 179-18.0FC.
Wurth, Walter: *See—*
Schacht, Hans; Bauer, Eberhard; Wurth, Walter; Schleicher, Karl; and Soyer, Wolfgang, 4,021,342.
Wurthner, Roland, to Leitz, Louis. Arrangement for releasably suspending a sheet member from a support. 4,020,951, Cl. 211-46.000.
Wycheck, Thomas Joseph, to International Telephone and Telegraph Corporation. Automatic group exclusion circuit for a key telephone system. 4,021,621, Cl. 179-99.000.
Xerox Corporation: *See—*
Brooke, Edric R., 4,020,788.
Daley, Howard L.; Davidson, Gerald S.; and Mitrovich, Svetislav, 4,020,940.
Elter, John F., 4,021,641.
Pundsack, Arnold L., 4,021,110.
Ruble, Frank D., 4,021,650.
Sheridon, Nicholas K.; and Kermisch, Dorian, 4,021,236.
Wang, Shing Chung, 4,021,845.
Wilson, Charles D., 4,021,112.
Yagi, Shizuo; and Miyaki, Kiyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust gas recirculation for emissions control. 4,020,808, Cl. 123-119.00A.
Yamada, Masaharu: *See—*
Shimamatsu, Hidenori; Yamada, Masaharu; Tanaka, Toshio; and Suzuki, Yahiko, 4,021,304.
Yamada, Seiji, to Minolta Camera Kabushiki Kaisha. Control device for automatically controlling the quantity of light from flash apparatus. 4,021,698, Cl. 315-241.00P.
Yamada, Yasufumi: *See—*
Ishihara, Tomoo; Sakai, Toshimitsu; and Yamada, Yasufumi, 4,021,712.
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, to Tokyo Gas Company Limited. Burner configurations for staged combustion. 4,021,188, Cl. 431-158.000.
Yamakawa, Goiti: *See—*
Tomono, Makoto; Yamakawa, Goiti; Inoue, Akira; and Otsuka, Masahiro, 4,021,358.
Yamamichi, Masayoshi: *See—*
Iura, Yukio; Yamamichi, Masayoshi; Uchiyama, Takashi; Taguchi, Tetsuya; and Mashimo, Yukio, 4,021,828.
Yamamura Glass Kabushiki Kaisha: *See—*
Watanabe, Muneo, 4,021,218.
Yamanouchi Pharmaceutical Co., Ltd.: *See—*
Murakami, Masuo; Takahashi, Kozo; Ozasa, Teruaki; Tamazawa, Kazuharu; Kawai, Ryutaro; Takenaka, Toichi; and Sato, Norio, 4,021,434.
Yamashita, Hiroshi: *See—*
Sashihara, Kenji; Masuda, Takao; Yamashita, Hiroshi; and Noguchi, Yasuhiro, 4,021,250.
Yamazaki, Sadanori: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, to Sumitomo Chemical Company, Limited. Process for electrolytic coloring of the anodic oxide film on aluminum or aluminum base alloys. 4,021,315, Cl. 204-35.00N.
Yanaka, Mikiro: *See—*
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, 4,021,390.
Yano, Kimio; Nagai, Tadaaki; Matsumoto, Koji; Nagayasu, Motokiyo; and Tanaka, Junichi, to Sumitomo Chemical Company, Limited. Process for producing aluminum. 4,021,318, Cl. 204-67.000.
Yardley, John P., to American Home Products Corporation. 2-[(Dimethylamino)(3-pyridyl)methyl]cyclohexanol and related compounds. 4,021,560, Cl. 424-263.000.
Yashiro, Kazuyoshi, to Benda Kogyo Co., Ltd. Method and apparatus for making annular metallic blanks. 4,020,878, Cl. 140-88.000.
Yasuda, Tetuya: *See—*
Yoshida, Masateru; Iinuma, Yoshio; Yasuda, Tetuya; and Kimura, Satoshi, 4,020,627.
Yatcilla, George E., to Sperry Rand Corporation. Tongue-mounted yieldable PTO driveline support. 4,020,913, Cl. 180-14.00R.
Yokokawa, Kiyosi: *See—*
Mukae, Satoshi; and Yokokawa, Kiyosi, 4,021,199.
Yokoyama, Kouzo: *See—*
Kuwabara, Tsuneo; Yokoyama, Kouzo; and Kobori, Takenobu, 4,020,626.
Yokoyama, Toshiro: *See—*
Ueshima, Takashi; Tanaka, Yasuzi; Yokoyama, Toshiro; and Kobayashi, Shoichi, 4,021,510.
Yoshida, Kimio: *See—*
Kojima, Hiromitsu; and Yoshida, Kimio, 4,020,944.
Yoshida, Masateru; Iinuma, Yoshio; Yasuda, Tetuya; and Kimura, Satoshi, to Citizen Watch Co., Ltd. Liquid crystal display electronic watch. 4,020,627, Cl. 58-50.00R.
Yoshida, Sadao: *See—*
Shimizu, Noboru; Yoshida, Sadao; Kubota, Kunihiro; and Ohara, Takashi, 4,021,310.
Yoshida, Tadao; and Suzuki, Tadao, to Sony Corporation. Amplifier with field effect transistors having triode-type dynamic characteristics. 4,021,748, Cl. 330-15.000.
Yoshida, Tadao: *See—*
Suzuki, Tadao; and Yoshida, Tadao, 4,021,745.
Yoshida, Takashi: *See—*
Chiku, Takewo; Ninomiya, Kiyoshi; Yoshida, Takashi; Kogiso, Takeshi; Hayashi, Hiroaki; and Matsui, Noboru, 4,021,255.
Yoshida, Tatsuro: *See—*
Nakanishi, Kakusaburo; Yoshida, Tatsuro; and Nakatubo, Kyoku, 4,021,508.
Yoshie, Shoichi: *See—*
Yamagishi, Kazuo; Nakamachi, Ichiro; Nozawa, Masaaki; Tokumoto, Tsunenori; Yoshie, Shoichi; Kakegawa, Yasuo; Kikuchi, Isamu; Iseda, Yoshihisa; Kanno, Yoshihiro; Yamazaki, Sadanori; and Sato, Masanobu, 4,021,188.

Yoshimura, Masayoshi, to Hitachi, Ltd. Transistor circuit for deep saturation prevention. 4,021,687, Cl. 307-300.000.
Yoshizoe, Sumio: *See—*
Asai, Yoshiteru; and Yoshizoe, Sumio, 4,021,272.
Young, Michael R. Fluid measuring valve and system to measure miles per gallon of a vehicle. 4,020,683, Cl. 73-114.000.
Young, Richard W., to Polaroid Corporation. Diffusion transfer processing solutions with carboxymethyl hydroxyethyl cellulose. 4,021,241, Cl. 96-29.00D.
Yu, Ruey J.; and Van Scott, Eugene J. Method for producing pigmentation in hair or skin. 4,021,538, Cl. 424-60.000.
Yu, Ruey J.: *See—*
Van Scott, Eugene J.; and Yu, Ruey J., 4,021,572.
Yuki, Toshihiro, to Nihon Kogyo Kabushiki Kaisha. Operating method for slag cleaning furnace in copper refining. 4,021,235, Cl. 75-72.000.
Yutaka Seiko Kabushiki Kaisha: *See—*
Toyomoto, Yoshitaka; and Kawasaki, Noboru, 4,021,051.
Zachar, Sem G.: *See—*
Teller, Ray E.; and Zachar, Sem G., 4,021,347.
Zahnradfabrik Friedrichshafen AG: *See—*
Lang, Armin, 4,020,748.
Zama, Hideo: *See—*
Kojima, Hiroomi; Zama, Hideo; Nomura, Sadao; Tabuchi, Toyoji; and Murata, Ryozo, 4,021,798.
Zameshaev, Valentin Sergeevich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.
Zechner, Gottfreid: *See—*
Gott, Hans; Ritter, Josef; Ritter, Klaus; Ritter, Gerhard; Zechner, Gottfreid; and Schmidt, Gerhard, 4,021,634.
Zehren, James N., to TRW Inc. Storm choke apparatus for submergible pumps. 4,021,137, Cl. 415-147.000.
Zeile, Karl: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; Engelhardt, Albrecht; and Taunecker, Werner, 4,021,576.
Zenith Carburetor Company Limited, The: *See—*
Ullman, Thomas James, 4,021,513.
Zenith Radio Corporation: *See—*
Collins, Johnny; Merrell, Richard G.; and Blass, David A., 4,021,741.
Podowski, Robert R.; and Citta, Richard W., 4,021,756.
Rogers, Melvin F., 4,021,850.
Zenitz, Bernard L., to Sterling Drug Inc. 3-(Piperidino-lower-alkyl)-indoles. 4,021,431, Cl. 260-293.610.
Zenos, Steven. Roof utility unit. 4,020,605, Cl. 52-66.000.
Zharkov, Leonid Petrovich: *See—*
Vlasov, Nikolai Nikiforovich; Golomazov, Viktor Andreevich; Dubrov, Nikolai Fedorovich; Zharkov, Leonid Petrovich; Karavai, Vladimir Alexandrovich; Likhov, Vitaly Kuzmich; Petukhov, Ivan Nikolaevich; Petrov, Kuart Mikhailovich; Rolschikov, Leonid Dmitrievich; Saveliev, Alexei Ivanovich; Sokolov, Nikolai Vasilievich; Khlestkin, Mikhail Petrovich; Khusnoyarov, Karl Borisovich, deceased; Lenkova, Evdokia Mikhailovna, administrator; and Lenkova, Nina Karlovna, administrator, 4,020,887.
Zimmerman, Harry M., to Reed Irrigation Systems, Inc. Self-locking coupling. 4,021,061, Cl. 285-13.000.
Zimmermann, Richard: *See—*
Turek, Klaus; Schumacher, Martin; and Zimmermann, Richard, 4,021,211.
Zindikus, Walter; Krobel, Heinz; and Franke, Walter, to AGFA-Gevaert, A.G. Cleaning device for electrostatic copiers. 4,021,113, Cl. 355-15.000.
Zine, Anthony R., Jr., to Corning Glass Works. Blood separating composition. 4,021,340, Cl. 210-83.000.
Zinpro Corporation: *See—*
Abdel-Monem, Mahmoud M., 4,021,569.
Zitz, Alfred: *See—*
Sigott, Siegfried; Zitz, Alfred; and Suessenbeck, Heinrich, 4,020,640.
Zoecon Corporation: *See—*
Henrick, Clive A., 4,021,461.
Zuk, Borys, to RCA Corporation. Flip-flop with setting and sensing circuitry. 4,021,686, Cl. 307-291.000.
Zur, Alexander: *See—*
Rutenberg, Alexander; and Zur, Alexander, 4,021,149.
ZVL Vyzkumny ustav pro valiva loziska: *See—*
Rajsigl, Zdenek, 4,021,086.
Zvyagintsev, Alexandr Ivanovich: *See—*
Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Kumysh, Ilya Iosifovich; Boiko, Georgy Alexandrovich; Beloglazov, Alexandr Petrovich; Dubinsky, Rudolf Solomonovich; Prikhodko, Valery Alexandrovich; Minasevich, Jury Vladislavovich; Zameshaev, Valentin Sergeevich; Nadtochy, Jury Alexandrovich; Zvyagintsev, Alexandr Ivanovich; and Ushakov, Anatoly Georgievich, 4,020,893.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 3RD DAY OF MAY, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, to Imperial Chemical Industries Limited. Polymeric film. T958,013, 5-3-77, Cl. 526-350.000.

Bell Telephone Laboratories, Incorporated: *See—*
Eichenbaum, Bernard Raymond; Sabia, Raffaele Antonio; and Tariyal, Basant Kumar, T958,010.
Snyder, Dennis Rex, T958,009.

Bond, James H.: *See—*
Russin, Nicholas C.; Bond, James H.; and Tershansy, Ronald A., T958,006.

Boston University, The Trustees of: *See—*
Laing, Ronald A., T958,011.

Cash, George O., Jr. Thermosetting cellulose ester powder coating compositions. T958,005, 5-3-77, Cl. 260-15.000.

Cates, Robert Eugene, to Hercules Incorporated. Milk carton paperboard. T958,002, 5-3-77, Cl. 162-135.000.

Collachia, Thomas J.: *See—*
Gower, Bob G.; and Collachia, Thomas J., T958,001.

Crane, Grant; and Kay, Edward Leo, to Firestone Tire & Rubber Company, The. Hot-melt adhesive, and wood composite structures produced therewith. T958,004, 5-3-77, Cl. 260-2.300.

Du Pont de Nemours, E. I., and Company: *See—*
Roberts, Winston James, T958,007.

Eichenbaum, Bernard Raymond; Sabia, Raffaele Antonio; and Tariyal, Basant Kumar, to Bell Telephone Laboratories, Incorporated. Protection of optical fibers from static fatigue. T958,010, 5-3-77, Cl. 350-96.0WG.

Firestone Tire & Rubber Company, The: *See—*
Crane, Grant; and Kay, Edward Leo, T958,004.

Gower, Bob G.; and Collachia, Thomas J., to Sinclair Oil Corporation. Metal-complexed polymer. T958,001, 5-3-77, Cl. 106-10.000.

Hartman, John Frederick: *See—*
Russel, Matthew Jouette; and Hartman, John Frederick, T958,003.

Hercules Incorporated: *See—*
Cates, Robert Eugene, T958,002.

Imperial Chemical Industries Limited: *See—*
Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, T958,013.

Jones, Eric: *See—*
Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, T958,013.

Kay, Edward Leo: *See—*
Crane, Grant; and Kay, Edward Leo, T958,004.

Laing, Ronald A., to Boston University, The Trustees of. Objective focusing method and apparatus for fundus photography. T958,011, 5-3-77, Cl. 351-7.000.

Padget, John Christopher: *See—*
Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, T958,013.

Petrizio, Cesare James, to RCA Corporation. Switching circuit. T958,008, 5-3-77, Cl. 323-19.000.

RCA Corporation: *See—*
Petrizio, Cesare James, T958,008.

Roberts, Winston James, to Du Pont de Nemours, E. I., and Company. Process for spinning acrylic fibers. T958,007, 5-3-77, Cl. 264-210.00F.

Russel, Matthew Jouette; and Hartman, John Frederick. Staple sensing apparatus. T958,003, 5-3-77, Cl. 227-1.000.

Russin, Nicholas C.; Bond, James H.; and Tershansy, Ronald A. Method for processing amorphous and partially crystalline polymers without sticking. T958,006, 5-3-77, Cl. 260-75.00T.

Sabia, Raffaele Antonio: *See—*
Eichenbaum, Bernard Raymond; Sabia, Raffaele Antonio; and Tariyal, Basant Kumar, T958,010.

Sinclair Oil Corporation: *See—*
Gower, Bob G.; and Collachia, Thomas J., T958,001.

Snyder, Dennis Rex, to Bell Telephone Laboratories, Incorporated. Electrical adapter. T958,009, 5-3-77, Cl. 339-99.00R.

Stoneham, Jeffrey Richard. Battery. T958,012, 5-3-77, Cl. 429-157.000.

Tariyal, Basant Kumar: *See—*
Eichenbaum, Bernard Raymond; Sabia, Raffaele Antonio; and Tariyal, Basant Kumar, T958,010.

Tershansy, Ronald A.: *See—*
Russin, Nicholas C.; Bond, James H.; and Tershansy, Ronald A., T958,006.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 3RD DAY OF MAY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Akitsuki, Ikuo: *See—*
Itoh, Takuji; and Akitsuki, Ikuo, Re. 29,198.

Aktiebolaget Leo: *See—*
Fex, Hans Jakob; Hogberg, Knut Bertil; Konyves, Imre; and Kneip, Paul Hans Otto Joseph, Re. 29,199.
Hogberg, Knut Bertil; Fex, Hans Jacob; Fredholm, Bo Goran; Perklev, Torsten Rune; and Veige, Sten Gunnar, Re. 29,202.

Branin, Phyllis Brown, to RCA Corporation. Method of making phosphor screens. Re. 29,203, Cl. 427-68.000.

Chapman, George William Allister: *See—*
Mathew, Leonard Stanley; and Chapman, George William Allister, Re. 29,197.

CPC International Inc.: *See—*
McKague, Allan B.; and deWaal, William, Re. 29,200.
McKague, Allan B.; deWaal, William; and Van Winckel, Carl E., Re. 29,201.

deWaal, William: *See—*
McKague, Allan B.; and deWaal, William, Re. 29,200.
McKague, Allan B.; deWaal, William; and Van Winckel, Carl E., Re. 29,201.

Esquire, Inc.: *See—*
Snyder, Carl R., Re. 29,204.

Fex, Hans Jacob: *See—*
Hogberg, Knut Bertil; Fex, Hans Jacob; Fredholm, Bo Goran; Perklev, Torsten Rune; and Veige, Sten Gunnar, Re. 29,202.

Fex, Hans Jakob; Hogberg, Knut Bertil; Konyves, Imre; and Kneip, Paul Hans Otto Joseph, to Aktiebolaget Leo. Certain steroid N-bis-(haloethyl)-carbamates. Re. 29,199, Cl. 260-397.500.

Fredholm, Bo Goran: *See—*
Hogberg, Knut Bertil; Fex, Hans Jacob; Fredholm, Bo Goran; Perklev, Torsten Rune; and Veige, Sten Gunnar, Re. 29,202.

Hogberg, Knut Bertil; Fex, Hans Jacob; Fredholm, Bo Goran; Perklev, Torsten Rune; and Veige, Sten Gunnar, to Aktiebolaget Leo. Secondary phosphoric acid esters. Re. 29,202, Cl. 260-942.000.

Hogberg, Knut Bertil: *See—*
Fex, Hans Jakob; Hogberg, Knut Bertil; Konyves, Imre; and Kneip, Paul Hans Otto Joseph, Re. 29,199.

Itoh, Takuji; and Akitsuki, Ikuo, to Toa Nenry Kogyo Kabushiki Kaisha. Process for preparing platinum-tin reforming catalyst and use thereof. Re. 29,198, Cl. 208-138.000.

Kneip, Paul Hans Otto Joseph: *See—*
Fex, Hans Jakob; Hogberg, Knut Bertil; Konyves, Imre; and Kneip, Paul Hans Otto Joseph, Re. 29,199.

Konyves, Imre: *See—*
Fex, Hans Jakob; Hogberg, Knut Bertil; Konyves, Imre; and Kneip, Paul Hans Otto Joseph, Re. 29,199.

Matbro Limited: *See—*
Mathew, Leonard Stanley; and Chapman, George William Allister, Re. 29,197.

Mathew, Leonard Stanley; and Chapman, George William Allister, to Matbro Limited. Shovel loaders. Re. 29,197, Cl. 214-140.000.

McKague, Allan B.; and deWaal, William, to CPC International Inc. Production of alkoxy phenolic compounds. Re. 29,200, Cl. 260-613.00D.

McKague, Allan B.; deWaal, William; and Van Winckel, Carl E., to CPC International Inc. Production of alkoxy phenolic compounds. Re. 29,201, Cl. 260-613.00D.

Perklev, Torsten Rune: *See—*
Hogberg, Knut Bertil; Fex, Hans Jacob; Fredholm, Bo Goran; Perklev, Torsten Rune; and Veige, Sten Gunnar, Re. 29,202.

RCA Corporation: *See—*
Branin, Phyllis Brown, Re. 29,203.

Snyder, Carl R., to Esquire, Inc. Controlled high voltage lighting system for gaseous-discharge lamps. Re. 29,204, Cl. 315-106.000.

Toa Nenry Kogyo Kabushiki Kaisha: *See—*
Itoh, Takuji; and Akitsuki, Ikuo, Re. 29,198.

Van Winckel, Carl E.: *See—*
McKague, Allan B.; deWaal, William; and Van Winckel, Carl E., Re. 29,201.

Veige, Sten Gunnar: *See—*
Hogberg, Knut Bertil; Fex, Hans Jacob; Fredholm, Bo Goran; Perklev, Torsten Rune; and Veige, Sten Gunnar, Re. 29,202.

LIST OF PLANT PATENTEES

DeVor Nurseries, Inc.: *See—*

Knight, Clysten, 4,046.

Knight, Clysten, to DeVor Nurseries, Inc. Rose plant named Parfait. 4,046, 5-3-77, Cl. 22.000.

Weeks, O. L. Rose plant. 4,047, 5-3-77, Cl. 24.000.

Weeks, O. L. Rose plant. 4,048, 5-3-77, Cl. 3.000.

LIST OF DESIGN PATENTEES

Adco Service, Inc.: *See—*
Boyland, Gail, 244,156.

Alabaster Industries: *See—*
Pearce, Thomas M., 244,170.
Pearce, Thomas M., 244,171.

Althans, Richard K.; and Boldt, Melvin H., to Zenith Radio Corporation. Television receiver. 244,231, 5-3-77, Cl. D14-80.000.

American Home Products Corporation: *See—*
Ramos, Jose R.; and Wald, Juan, 244,200.

Arthur Salm, Inc.: *See—*
Stahel, Alwin J., 244,234.

Averill, Carol. Record album frame. 244,158, 5-3-77, Cl. D6-242.000.

Barnsley, Frank Bernard, to Formula Housing Research Limited. Cutting board or the like. 244,169, 5-3-77, Cl. D7-46.000.

Beasley, Michael J. Table top or similar unit. 244,157, 5-3-77, Cl. D6-192.000.

Becker, Robert W.; Boldt, Melvin H.; and Chuboff, David P., to Zenith Radio Corporation. Television receiver. 244,232, 5-3-77, Cl. D14-80.000.

Beigel, Michael L.: *See—*
Ross, Herbert; and Beigel, Michael L., 244,214.

Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., to International Telephone and Telegraph Corporation. Terminal for a video telephone unit. 244,205, 5-3-77, Cl. D14-54.000.

Besasie, Joseph C., to Koss Corporation. Headphone earpiece. 244,213, 5-3-77, Cl. D14-37.000.

Bliven, Robert P. Telephone. 244,207, 5-3-77, Cl. D14-53.000.

Bliven, Robert P. Telephone. 244,208, 5-3-77, Cl. D14-53.000.

Bliven, Robert P. Telephone. 244,209, 5-3-77, Cl. D14-53.000.

Bliven, Robert P. Telephone. 244,210, 5-3-77, Cl. D14-53.000.

Bliven, Robert P. Telephone. 244,211, 5-3-77, Cl. D14-53.000.

Boldt, Melvin H.: *See—*
Althans, Richard K.; and Boldt, Melvin H., 244,231.
Becker, Robert W.; Boldt, Melvin H.; and Chuboff, David P., 244,232.

Bowe, James M.: *See—*
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 244,190.

Boyland, Gail, to Adco Service, Inc. Head garment. 244,156, 5-3-77, Cl. D2-239.000.

Brennan, David L.: *See—*
Mueller, Eugene A., 244,185.
Mueller, Eugene A., 244,186.
Mueller, Eugene A., 244,187.
Mueller, Eugene A., 244,188.
Mueller, Eugene A., 244,189.

Bridge-O-Matic Corporation: *See—*
Kucera, George F., 244,223.

Bridgestone Tire Company Limited: *See—*
Maeda, Muneyoshi; Kojima, Hiroshi; and Hayakawa, Toshio, 244,181.

Briggs, Eugene C.; and Wellbaum, William C., to Koehring Company. Motor-transformer unit. 244,204, 5-3-77, Cl. D13-1.000.

Brookes, Malcolm J.: *See—*
Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., 244,205.

Christian Dior, S.A.R.L.: *See—*
Zimmermann, Hilde, 244,196.

Chuboff, David P.: *See—*
Becker, Robert W.; Boldt, Melvin H.; and Chuboff, David P., 244,232.

Cole, Howard C.: *See—*
Skidmore, Wilbert L.; and Cole, Howard C., 244,182.

Corrado, Frank C.; Harvey, Frederick W.; Nedwidek, Richard R.; and Neubauer, Richard C., to Eastman Kodak Company. Film-loaded cartridge. 244,202, 5-3-77, Cl. D14-11.000.

D'Aiuto, Frank. Combined dial and hands for a timepiece. 244,178, 5-3-77, Cl. D10-126.000.

D'Aiuto, Frank. Combined dial and hands for a timepiece. 244,179, 5-3-77, Cl. D10-126.000.

Dart Industries Inc.: *See—*
Haynes, Rodney R., Sr., 244,164.

Davis, Lloyd L. Free-standing fireplace. 244,199, 5-3-77, Cl. D23-97.000.

De brey, Robert J., to Northland Group, Inc., The. Hockey stick. 244,220, 5-3-77, Cl. D34-5.0BC.

Diehl, John A. Studded, rubber crop topping flail for use on sugar beet harvesting machine. 244,191, 5-3-77, Cl. D15-28.000.

Driltech, Inc.: *See—*
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 244,190.

Eastman Kodak Company: *See—*
Corrado, Frank C.; Harvey, Frederick W.; Nedwidek, Richard R.; and Neubauer, Richard C., 244,202.

Fairchild Industries Inc.: *See—*
Rosenthal, Gordon, 244,180.

Federal Paper Board Company, Inc.: *See—*
McCormick, Jeanne M., 244,167.

Fiberglass in Motion, Inc.: *See—*
Skidmore, Wilbert L.; and Cole, Howard C., 244,182.

Flex-O-Lators, Inc.: *See—*
Wittenberg, Roger A., 244,166.

Formula Housing Research Limited: *See—*
Barnsley, Frank Bernard, 244,169.

Friedman, Ira, to Rowe Furniture Corporation. Seat. 244,160, 5-3-77, Cl. D6-63.000.

Friedman, Ira, to Rowe Furniture Corporation. Seat. 244,161, 5-3-77, Cl. D6-63.000.

Friedman, Ira, to Rowe Furniture Corporation. Chair. 244,163, 5-3-77, Cl. D6-69.000.

Fujita Industrial Co., Ltd.: *See—*
Fukuyama, Yasuharu, 244,175.

Fukuyama, Yasuharu, to Fujita Industrial Co., Ltd. Vehicle wheel locking nut. 244,175, 5-3-77, Cl. D8-397.000.

Garto, Anthony: *See—*
Garto, Joseph Benjamin; and Garto, Anthony, 244,221.

Garto, Joseph Benjamin; and Garto, Anthony. Amusement apparatus. 244,221, 5-3-77, Cl. D34-5.00J.

Gerber, William C., to Rubbermaid Incorporated. Pet feeding dish. 244,216, 5-3-77, Cl. D30-16.000.

Gordon, Roy R. Motorcycle dash panel. 244,183, 5-3-77, Cl. D12-192.000.

Hamada, Masanori: *See—*
Kawano, Takeyoshi; and Hamada, Masanori, 244,228.

Hamlin, Richard M.: *See—*
Mueller, Eugene A., 244,185.
Mueller, Eugene A., 244,186.
Mueller, Eugene A., 244,187.
Mueller, Eugene A., 244,188.
Mueller, Eugene A., 244,189.

Harvey, Frederick W.: *See—*
Corrado, Frank C.; Harvey, Frederick W.; Nedwidek, Richard R.; and Neubauer, Richard C., 244,202.

Hayakawa, Toshio: *See—*
Maeda, Muneyoshi; Kojima, Hiroshi; and Hayakawa, Toshio, 244,181.

Haynes, Rodney R., Sr., to Dart Industries Inc. Arm chair. 244,164, 5-3-77, Cl. D6-71.000.

Hiraoka Los Angeles, Inc.: *See—*
Susich, Roland J., 244,230.

Hisano, Yoichi, to Matsushita Electric Industrial Co., Ltd. Combined tape recorder and radio receiver. 244,212, 5-3-77, Cl. D14-5.000.

Hurco Manufacturing Company, Inc.: *See—*
Roch, Gerald V., 244,193.
Roch, Gerald V., 244,194.
Roch, Gerald V., 244,195.

International Telephone and Telegraph Corporation: *See—*
Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., 244,205.

J. C. Penney Company: *See—*
Ostroll, Henry D., 244,197.

Kamensky, Robert. Combined pen holder and ink stand. 244,198, 5-3-77, Cl. D19-79.000.

Kawano, Takeyoshi; and Hamada, Masanori, to Matsushita Electric Industrial Co., Ltd. Radio receiver. 244,228, 5-3-77, Cl. D14-70.000.

Klepa, Peter P. Telephone. 244,206, 5-3-77, Cl. D14-53.000.

Koehring Company: *See—*
Briggs, Eugene C.; and Wellbaum, William C., 244,204.

Kojima, Hiroshi: *See—*
Maeda, Muneyoshi; Kojima, Hiroshi; and Hayakawa, Toshio, 244,181.

Koss Corporation: *See—*
Besasie, Joseph C., 244,213.

Kubitskey, Gary R., to Wisco Corporation. Automotive hood ornament. 244,184, 5-3-77, Cl. D12-200.000.

Kucera, George F., to Bridge-O-Matic Corporation. Card game simulator. 244,223, 5-3-77, Cl. D34-13.00A.

Kuramochi, Shigeaki. Typewriter casing. 244,233, 5-3-77, Cl. D64-11.00A.

Kushida, Keizo, to Matsushita Electric Industrial Co., Ltd. Portable radio. 244,227, 5-3-77, Cl. D14-70.000.

Lee, Ernest, to Sunbeam Corporation. Hot dog cooker. 244,172, 5-3-77, Cl. D7-85.000.

Lichowsky, Abraham, to Medical Monitors, Inc. Automatic blood pressure measuring apparatus. 244,235, 5-3-77, Cl. D24-21.000.

Lubke, Karl, to Lubke KG. Chair. 244,162, 5-3-77, Cl. D6-69.000.

Lubke KG: *See—*
Lubke, Karl, 244,162.

Maeda, Muneyoshi; Kojima, Hiroshi; and Hayakawa, Toshio, to Bridgestone Tire Company Limited. Vehicle tire. 244,181, 5-3-77, Cl. D12-142.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Hisano, Yoichi, 244,212.
Kawano, Takeyoshi; and Hamada, Masanori, 244,228.
Kushida, Keizo, 244,227.
Taguchi, Shuhei, 244,229.

McClary, Joseph M. Animal figure toy. 244,224, 5-3-77, Cl. D34-15.00B.

McCormick, Jeanne M., to Federal Paper Board Company, Inc. Drinking glass. 244,167, 5-3-77, Cl. D7-5.000.

Medical Monitors, Inc.: *See—*
Lichowsky, Abraham, 244,235.

Menn, Walter A.: *See—*
Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., 244,205.

Mueller, Eugene A., to Brennan, David L.; and Hamlin, Richard M. Vehicle wheel. 244,185, 5-3-77, Cl. D12-212.000.

Mueller, Eugene A., to Brennan, David L.; and Hamlin, Richard M. Vehicle wheel. 244,186, 5-3-77, Cl. D12-212.000.

Mueller, Eugene A., to Brennan, David L.; and Hamlin, Richard M. Vehicle wheel. 244,187, 5-3-77, Cl. D12-212.000.

Mueller, Eugene A., to Brennan, David L.; and Hamlin, Richard M. Vehicle wheel. 244,188, 5-3-77, Cl. D12-212.000.

Mueller, Eugene A., to Brennan, David L.; and Hamlin, Richard M. Vehicle wheel. 244,189, 5-3-77, Cl. D12-212.000.

Murray, Clarence Ray. Agricultural implement hitch. 244,192, 5-3-77, Cl. D15-28.000.

Muse, George B. Interlocking building block. 244,201, 5-3-77, Cl. D25-87.000.

Musitronics Corporation: *See—*
Ross, Herbert; and Beigel, Michael L., 244,214.
Ross, Herbert, 244,215.

Nedwidek, Richard R.: *See—*
Corrado, Frank C.; Harvey, Frederick W.; Nedwidek, Richard R.; and Neubauer, Richard C., 244,202.

Neubauer, Richard C.: *See—*
Corrado, Frank C.; Harvey, Frederick W.; Nedwidek, Richard R.; and Neubauer, Richard C., 244,202.

Northland Group, Inc., The: *See—*
De brey, Robert J., 244,220.

Ostroll, Henry D., to J. C. Penney Company. Size indicator for a garment hanger. 244,197, 5-3-77, Cl. D19-13.000.

Palmer, Alvin E. Buffet. 244,165, 5-3-77, Cl. D6-166.000.

Pardo, John, to Procter & Gamble Company, The. Bottle. 244,176, 5-3-77, Cl. D9-156.000.

Pearce, Richard J.: *See—*
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 244,190.

Pearce, Thomas M., to Alabaster Industries. Strainer. 244,170, 5-3-77, Cl. D7-47.000.

Pearce, Thomas M., to Alabaster Industries. Funnel. 244,171, 5-3-77, Cl. D7-68.000.

Poirier, Roger J. Hockey stick. 244,219, 5-3-77, Cl. D34-5.0BC.

Procter & Gamble Company, The: *See—*
Pardo, John, 244,176.

Ramos, Jose R.; and Wald, Juan, to American Home Products Corporation. Air freshener container or the like. 244,200, 5-3-77, Cl. D23-150.000.

Raviscioni, Jo. Doll. 244,218, 5-3-77, Cl. D34-4.00R.

Roch, Gerald V., to Hurco Manufacturing Company, Inc. Gauge carriage support, guideway and drive housing for machine tools. 244,193, 5-3-77, Cl. D15-123.000.

Roch, Gerald V., to Hurco Manufacturing Company, Inc. Front gauge mount and drive assembly for machine tools. 244,194, 5-3-77, Cl. D15-123.000.

Roch, Gerald V., to Hurco Manufacturing Company, Inc. Rear gauge mount and drive assembly for machine tools. 244,195, 5-3-77, Cl. D15-123.000.

Rosenthal, Gordon, to Fairchild Industries Inc. Aircraft. 244,180, 5-3-77, Cl. D12-71.000.

Ross, Herbert; and Beigel, Michael L., to Musitronics Corporation. Electronic musical accessory. 244,214, 5-3-77, Cl. D14-96.000.

Ross, Herbert, to Musitronics Corporation. Housing for sound modifier or the like. 244,215, 5-3-77, Cl. D14-96.000.

Rowe Furniture Corporation: *See—*
Friedman, Ira, 244,160.
Friedman, Ira, 244,161.
Friedman, Ira, 244,163.

Rubbermaid Incorporated: *See—*
Gerber, William C., 244,216.

Sankey, Lawrence E. Portable lock. 244,174, 5-3-77, Cl. D8-331.000.

Schreiber, Gerald A. Game board. 244,222, 5-3-77, Cl. D34-5.0SS.

Schroeder, Peter E. Curtain material. 244,225, 5-3-77, Cl. D47-6.00E.

Simerl, R. A. Anemometer generator frame. 244,203, 5-3-77, Cl. D10-103.000.

Simerl, R. A. Combined top sender and bearing plate for an anemometer. 244,226, 5-3-77, Cl. D15-199.000.

Skidmore, Wilbert L.; and Cole, Howard C., to Fiberglass in Motion, Inc. Camper shell. 244,182, 5-3-77, Cl. D12-156.000.

Sowers, Merion A. Bench or similar article. 244,159, 5-3-77, Cl. D6-60.000.

Spranger, Douglas M.: *See—*
Benham, Edward Edmund; Menn, Walter A.; Spranger, Douglas M.; and Brookes, Malcolm J., 244,205.

Stahel, Alwin J., to Arthur Salm, Inc. Mileage calculator. 244,234, 5-3-77, Cl. D64-11.00B.

Sunbeam Corporation: *See—*
Lee, Ernest, 244,172.

Susich, Roland J., to Hiraoka Los Angeles, Inc. Radio. 244,230, 5-3-77, Cl. D14-69.000.

Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., to Drilltech, Inc. Well drilling vehicle. 244,190, 5-3-77, Cl. D15-21.000.

Taguchi, Shuhei, to Matsushita Electric Industrial Co., Ltd. Combined radio receiver and tape recorder. 244,229, 5-3-77, Cl. D14-5.000.

Thurman, Paul G. Laundry basket. 244,173, 5-3-77, Cl. D7-163.000.

Wald, Juan: *See—*
Ramos, Jose R.; and Wald, Juan, 244,200.

Ward, Dennis H. Barrel. 244,177, 5-3-77, Cl. D9-170.000.

Wellbaum, William C.: *See—*
Briggs, Eugene C.; and Wellbaum, William C., 244,204.

Wisco Corporation: *See—*
Kubitskey, Gary R., 244,184.

Wittenberg, Roger A., to Flex-O-Lators, Inc. Furniture deck edging. 244,166, 5-3-77, Cl. D6-191.000.

Wycalis, Dolores. Doll or similar article. 244,217, 5-3-77, Cl. D34-4.00R.

Young, Julius. Plate. 244,168, 5-3-77, Cl. D7-33.000.

Zenith Radio Corporation: *See—*
Althans, Richard K.; and Boldt, Melvin H., 244,231.
Becker, Robert W.; Boldt, Melvin H.; and Chuboff, David P., 244,232.

Zimmermann, Hilde, to Christian Dior, S.A.R.L. Eyeglass frame. 244,196, 5-3-77, Cl. D16-65.000.

V
9
5
8
/
1

1
/
8

7
7

CLASSIFICATION OF PATENTS

ISSUED MAY 3, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
411 4,020,507

CLASS 4
67 A 4,020,508
172.19 4,020,509

CLASS 5
264 R 4,020,512
332 4,020,510
337 4,020,511

CLASS 8
21 A 4,021,196

CLASS 9
1.5 4,020,513
8 R 4,020,514

CLASS 10
155 A 4,020,515

CLASS 11
1 A 4,020,516

CLASS 13
29 4,021,602
35 4,021,603

CLASS 14
71.5 4,020,517

CLASS 15
53 B 4,020,518
104.92 4,020,519
172 4,020,521
176 4,020,520
180 4,020,522
257.05 4,020,523
302 4,020,524
339 4,020,525
364 4,020,526

CLASS 16
110 R 4,020,527

CLASS 17
50 4,020,528

CLASS 21
84 4,021,197

CLASS 23
230 B 4,021,198
253 A 4,021,199
4,021,201
253 R 4,021,200
260 4,021,202
288 FC 4,021,203

CLASS 24
90 TB 4,020,529
252 R 4,020,530
255 R 4,020,532
276 4,020,533
284 4,020,531

CLASS 29
25.11 4,020,534
25.18 4,020,535
25.42 4,020,536
26 A 4,020,537
156.8 H 4,020,538
157 R 4,020,539
157.3 R 4,021,204
283 4,020,541
411 4,020,542
423 4,020,543
513 4,020,544
568 4,020,545
628 4,020,546
629 4,020,547
630 R 4,020,548
749 4,020,540

CLASS 30
30 4,020,549
124 4,020,550
164.8 4,020,551
276 4,020,552
347 4,020,553
358 4,020,554
392 4,020,555

CLASS 32
15 4,020,557
27 4,020,556
40 R 4,020,558

CLASS 33
265 4,020,560
272 4,020,559

CLASS 34
12 4,020,562
13 4,020,561
48 4,020,563
57 R 4,020,564
93 4,020,565

CLASS 35
18 A 4,020,566
35 C 4,020,567
42.5 4,020,568

CLASS 36
29 4,020,569
44 4,020,570
50 4,020,571
137 4,020,572

CLASS 37
63 4,020,573
126 AE 4,020,574

CLASS 40
1.5 4,020,575
86 R 4,020,576

CLASS 42
16 4,020,577

CLASS 43
17 4,020,578
4,020,579
17.5 4,020,580
18 GF 4,020,581
19.2 4,020,582
42.41 4,020,583
57.5 R 4,020,584
96 4,020,585

CLASS 44
10 R 4,021,206
62 4,021,207

CLASS 46
164 4,020,586
202 4,020,587
216 4,020,588
270 4,020,589

CLASS 47
1.3 4,020,590
28 R 4,020,591
71 4,020,592

CLASS 49
103 4,020,593
220 4,020,594
306 4,020,595

CLASS 51
9 M 4,020,596
4,020,597
34 R 4,020,598
178 4,020,599
237 R 4,020,600
238 R 4,020,601
295 4,021,208
298 A 4,021,209

CLASS 52
35 4,020,602
53 4,020,603
65 4,020,604
66 4,020,605
116 4,020,606
173 DS 4,020,607
321 4,020,613
473 4,020,609
511 4,020,610
584 4,020,611
731 4,020,612

CLASS 53
26 4,020,614
35 4,020,615
54 4,020,616
229 4,020,617
234 4,020,608
390 4,020,618

CLASS 55
18 4,021,211
26 4,021,210
470 4,021,212

CLASS 56
11.2 4,020,619
370 4,020,620

CLASS 57
34 R 4,020,621
4,020,622
157 F 4,020,623

CLASS 58
2 4,020,624
21.13 4,020,625
23 R 4,020,626
50 R 4,020,627
145 K 4,020,628

CLASS 59
85 4,020,629
86 4,020,630
90 4,020,631

CLASS 60
39.03 4,020,632
445 4,020,633
517 4,020,634
525 4,020,635
547 4,020,636
665 4,020,637
718 4,020,638

CLASS 61
10 4,020,639
45 D 4,020,640
72.7 4,020,641

CLASS 62
84 4,020,642
180 4,021,213
244 4,021,214
322 4,020,643
340 4,020,644
402 4,021,215
474 4,020,645
492 4,020,646
508 4,020,647

CLASS 63
32 4,020,649

CLASS 64
21 4,020,648
4,020,650
23 4,020,651

CLASS 65
4 B 4,021,216
13 4,021,217
30 E 4,021,218
43 4,021,219

CLASS 66
50 R 4,020,652
93 4,020,653
125 R 4,020,654
157 4,020,655
213 4,020,656

CLASS 68
5 C 4,020,658
5 E 4,020,657
27 4,020,659

CLASS 69
6.5 4,020,660

CLASS 70
58 4,020,661
237 4,020,662

CLASS 71
27 4,021,220
86 4,021,221
88 4,021,222
4,021,223
4,021,224
90 4,021,225
92 4,021,226
4,021,227
96 4,021,228
100 4,021,229
111 4,021,230
127 4,021,231

CLASS 72
56 4,020,663
108 4,020,664
4,020,665
177 4,020,666
205 4,020,667
285 4,020,668
294 4,020,669
349 4,020,670
450 4,020,671

CLASS 73
12 4,020,672
37 4,020,673
40.5 R 4,020,674
41 4,020,675
61 R 4,020,676
4,020,677
67.2 4,020,678
67.8 S 4,020,679
86 4,020,680
88 R 4,020,681
104 4,020,682
114 4,020,683
134 4,020,684
136 A 4,020,685
141 A 4,020,686
141 R 4,020,687
151 4,020,688
272 R 4,020,689
299 4,020,690
304 C 4,020,691
339 A 4,020,692
4,020,693
343 R 4,020,694
355 EM 4,020,695
412 4,020,696
421.5 R 4,020,697
425.6 4,020,698
497 4,020,699
516 LM 4,020,700

CLASS 74
5 R 4,020,701
5.34 4,020,702
10.33 4,020,704
10.54 4,020,705
16 4,020,706
37 4,020,707
52 4,020,708
89.15 4,020,709
206 4,020,710
230.17 E 4,020,711
250 R 4,020,712
479 4,020,713
572 4,020,714
600 4,020,703
606 R 4,020,715
768 4,020,716
804 4,020,717
869 4,020,718

CLASS 75
12 4,021,232
60 4,021,233
66 4,021,234
72 4,021,235
246 4,021,205

CLASS 81
9.3 4,020,719
57.38 4,020,720

CLASS 83
37 4,020,721
74 4,020,722
268 4,020,723
346 4,020,724
349 4,020,725
397 4,020,726
580 4,020,727

CLASS 84
1.03 4,020,728
1.28 4,020,729
173 4,020,730
282 4,020,731
322 4,020,732
503 4,020,733

CLASS 85
62 4,020,734
67 4,020,735

CLASS 86
20 B 4,020,736
23 4,020,737

CLASS 89
33 F 4,020,738
41 ME 4,020,739
129 B 4,020,740
185 4,020,741

CLASS 90
11 E 4,020,742
13.3 4,020,743

CLASS 91
216 B 4,020,744
217 4,020,745
291 4,020,746
298 4,020,747
449 4,020,748

CLASS 92
48 4,020,749
205 4,020,750

CLASS 93
77 FT 4,020,751

CLASS 96
1.5 4,021,236
4,021,237
22 4,021,238
27 E 4,021,239
29 D 4,021,240
4,021,241
36 4,021,242
36.4 4,021,243
67 4,021,244
4,021,245
4,021,246
94 R 4,021,247
100 4,021,248
114.1 4,021,249
4,021,250
140 4,021,251

CLASS 98
40 C 4,020,753
40 D 4,020,752
59 4,020,754

CLASS 100
12 4,020,755
26 4,020,756

CLASS 101
18 4,020,757
110 4,020,758
328 4,020,759
366 4,020,760
457 4,020,761
467 4,020,762

CLASS 102
44 4,020,763
70 S 4,020,764
70.2 R 4,020,765
80 4,020,766

CLASS 104
35 4,020,767
172 BT 4,020,768

CLASS 105
481 4,020,769
482 4,020,770

CLASS 106
30 4,021,252
53 4,021,253
58 4,021,254
73.4 4,021,255
74 4,021,256
90 4,021,257
99 4,021,258
111 4,021,259
213 4,021,260
264 4,021,261
271 4,021,262
288 B 4,021,263

CLASS 108
86 4,020,771

CLASS 110
56 4,020,772
165 R 4,020,773

CLASS 112
79 A 4,020,774
121.15 4,020,775
121.26 4,020,776

CLASS 114
203 4,020,778
243 4,020,780
258 4,020,777
293 4,020,779

CLASS 115
34 A 4,020,781
70 4,020,782

CLASS 116
114 PV 4,020,783
4,020,784
118 A 4,020,785
124 B 4,020,786
129 K 4,020,787

CLASS 118
7 4,020,788
44 4,020,790
49.1 4,020,791
308 4,020,789
629 4,020,792

CLASS 119
18 4,020,793
58 4,020,794
106 4,020,795
158 4,020,796

CLASS 122
2 4,020,797

CLASS 123
1 A 4,020,798
8.13 4,020,799
4,020,800
32 EA 4,020,802
32 SP 4,020,801
32 VN 4,020,803
46 R 4,020,804
52 M 4,020,805
90.55 4,020,806
117 R 4,020,807
119 A 4,020,808
4,020,809
120 4,020,810
122 AC 4,020,811
122 F 4,020,812
124 B 4,020,813
140 MC 4,020,814
142.5 R 4,020,815
148 E 4,020,816
191 SP 4,020,817
198 DB 4,020,818

CLASS 124
23 R 4,020,819

CLASS 125
11 R 4,020,820

CLASS 126
39 E 4,020,821
110 R 4,020,822
121 4,020,823
164 4,020,824
206 4,020,825
270 4,020,826
271 4,020,827
4,020,828

CLASS 128
2 E 4,020,830
2 F 4,020,831
2 M 4,020,829
90 4,020,832
142 R 4,020,833
145.6 4,020,834
214.4 4,020,835
216 4,020,836

218 N 4,020,837
223 4,020,838
272 4,020,839
276 4,020,840
285 4,020,841
287 4,020,842
295 4,020,843
303 R 4,020,844
305 4,020,845
4,020,846
4,020,847
330 4,020,848
351 4,020,849

CLASS 131

15 R 4,020,850
21 B 4,020,851
94 4,020,852
195 4,020,853

CLASS 132

9 4,020,854
40 4,020,855
74.5 4,020,856

CLASS 134

3 4,021,264
7 4,020,857
22 C 4,021,265
63 4,021,266

CLASS 135

20 R 4,020,858

CLASS 136

89 PC 4,021,267
228 4,021,268

CLASS 137

14 4,020,859
69 4,020,860
100 4,020,861
115 4,020,862
116.5 4,020,863
242 4,020,864
268 4,020,865
592 4,020,866
596.13 4,020,867
610 4,020,868
613 4,020,869
625.3 4,020,870
636.1 4,020,871

CLASS 138

30 4,020,872
96 T 4,020,873
4,020,874
128 4,020,875

CLASS 139

97 4,020,876
435 4,020,877

CLASS 140

88 4,020,878
123.6 4,020,879
140 4,020,880

CLASS 141

1 4,020,881
1.1 4,020,882

CLASS 144

208 E 4,020,883

CLASS 148

1.5 4,021,269
4,021,270
2 4,021,271
15 4,021,272
121 4,021,273
146 4,021,274

CLASS 149

35 4,021,275

CLASS 150

3 4,020,884

CLASS 152

239 4,020,885
243 4,020,886
359 4,020,887

CLASS 156

80 4,021,280
167 4,021,281
210 4,021,282
244 4,021,283
277 4,021,284
446 4,021,285
4,021,286
497 4,021,287
499 4,021,288
4,021,289
510 4,021,290
513 4,021,291
552 4,021,292
568 4,021,293

623 Q 4,021,294
626 4,021,278
644 4,021,276
654 4,021,279
657 4,021,277

CLASS 160

66 4,020,888
120 4,020,889

CLASS 162

125 4,021,295
214 4,021,296

CLASS 164

49 4,020,890
82 4,020,891
89 4,020,892
252 4,020,893
343 4,020,894

CLASS 165

1 4,020,895
10 4,020,896
12 4,020,897
105 4,020,898
110 4,020,899
135 4,020,900

CLASS 166

50 4,020,901
52 4,020,902

CLASS 169

47 4,020,903
74 4,020,904
76 4,020,905

CLASS 172

350 4,020,906
554 4,020,907
742 4,020,908

CLASS 173

147 4,020,909

CLASS 174

51 4,021,604

CLASS 175

345 4,020,910

CLASS 176

30 4,021,297
37 4,021,301
39 4,021,298
4,021,299
78 4,021,300

CLASS 177

136 4,020,911
178 4,020,912

CLASS 178

30 4,021,608
69.1 4,021,609

CLASS 179

1 D 4,021,613
1 GQ 4,021,612
1 N 4,021,611
1 VL 4,021,610
4,021,614
2 A 4,021,615
15 BV 4,021,616
17 E 4,021,617
18 FC 4,021,618
4,021,619
84 VF 4,021,620
99 4,021,621
4,021,622
170.2 4,021,623
175.2 D 4,021,624
175.3 R 4,021,625

CLASS 180

14 R 4,020,913
25 R 4,020,914
64 A 4,020,915
65 R 4,020,916
66 R 4,020,917
79.1 4,020,918

CLASS 181

119 4,020,919

CLASS 182

19 4,020,920
45 4,020,921

CLASS 184

1.5 4,020,922

CLASS 185

11 4,020,923

CLASS 186

1 A 4,020,924

CLASS 188

24 4,020,925
75 4,020,926
184 4,020,927
237 4,020,928
321 4,020,929

CLASS 190

51 4,020,930

CLASS 192

3 TR 4,020,931
4 A 4,020,932
86 4,020,933
87.17 4,020,934
104 R 4,020,935
105 BA 4,020,936
107 R 4,020,937
142 R 4,020,938

CLASS 195

1.8 4,021,302
5 4,021,303
28 R 4,021,304
54 4,021,305
81 4,021,306
103.5 R 4,021,307
127 4,021,308

CLASS 197

1 R 4,020,939
151 4,020,940

CLASS 198

402 4,020,941
422 4,020,942
445 4,020,943
473 4,020,944
502 4,020,945

CLASS 200

33 R 4,021,626
56 R 4,021,627
144 B 4,021,628
4,021,629
159 B 4,021,630
238 4,021,631
250 4,021,632
262 4,021,633

CLASS 202

227 4,021,309

CLASS 203

8 4,021,310
69 4,021,311
80 4,021,312

CLASS 204

1.5 4,021,313
30 4,021,314
35 N 4,021,315
43 S 4,021,316
67 4,021,317
4,021,318
96 4,021,319
4,021,320
103 4,021,321
4,021,322
129 4,021,323
180 G 4,021,324
195 M 4,021,325
195 S 4,021,326
296 4,021,327

CLASS 206

45.16 4,020,946
45.31 4,020,947
315 B 4,020,948

CLASS 208

8 4,021,328
10 4,021,329
89 4,021,330
111 4,021,331
120 4,021,332
138 Re.29,198
179 4,021,333
211 4,021,334
309 4,021,335

CLASS 209

73 4,020,949
4,020,950
74 M 4,021,336
329 4,021,337

CLASS 210

63 R 4,021,338
80 4,021,339
83 4,021,340
87 4,021,341
94 4,021,342
110 4,021,343
122 4,021,344
146 4,021,345
179 4,021,346
195 S 4,021,347
208 4,021,348
219 4,021,349
232 4,021,350
4,021,351
359 4,021,352
448 4,021,353
477 4,021,354

CLASS 211

46 4,020,951

CLASS 214

1 PA 4,020,952
14 4,020,953
15 R 4,020,954
16.4 R 4,020,955
17 DA 4,020,956
38 R 4,020,957
41 R 4,020,958
84 4,020,959
140 Re.29,197
390 4,020,960
450 4,020,961
518 4,020,962
762 4,020,963

CLASS 215

11 C 4,020,964
213 4,020,965
349 4,020,966

CLASS 219

56 4,021,634
69 G 4,021,635
121 EB 4,021,636
146 4,021,637
200 4,021,638
201 4,021,639
211 4,021,640
216 4,021,641
391 4,021,642
523 4,021,643

CLASS 220

6 4,020,967
90 4,020,968
265 4,020,969
293 4,020,970
378 4,020,971

CLASS 221

13 4,020,972
4,020,973
307 4,020,974

CLASS 222

93 4,020,975
103 4,020,976
145 4,020,977
209 4,020,978
211 4,020,979
411 4,020,980
525 4,020,981
554 4,020,982

CLASS 223

49 4,020,983

CLASS 224

1 B 4,020,984
5 R 4,020,985
42.42 R 4,020,986

CLASS 226

20 4,021,031

CLASS 228

56 4,020,987

CLASS 229

16 A 4,020,988

CLASS 235

92 PL 4,021,646
92 TC 4,021,644
4,021,645
92 TF 4,021,647
150.53 4,021,648
151.11 4,021,650
4,021,651
151.3 4,021,649
152 4,021,652
4,021,653
156 4,021,655
4,021,656
181 4,021,657
183 4,021,658

CLASS 237

1 A 4,020,989

CLASS 239

346 4,020,990
655 4,020,991

CLASS 240

41.36 4,021,659
41.55 4,021,660

CLASS 241

18 4,020,992
24 4,020,993
30 4,020,994
101.2 4,020,995

CLASS 242

7.03 4,020,996
18 PW 4,020,997
39 4,020,998
55.19 A 4,020,999
56.1 4,021,000
58.1 4,021,002
68.5 4,021,001
84.1 A 4,021,003
118.6 4,021,004
198 4,021,005
199 4,021,006

CLASS 244

3.13 4,021,007
134 D 4,021,008
180 4,021,009
182 4,021,010

CLASS 248

235 4,021,011
352 4,021,012
453 4,021,013

CLASS 249

45 4,021,014

CLASS 250

199 4,021,661
203 R 4,021,662
227 4,021,663
4,021,664
239 4,021,665
265 4,021,666
273 4,021,667
315 A 4,021,668
328 4,021,669
4,021,670
381 4,021,671
402 4,021,672
445 T 4,021,673
492 A 4,021,674
4,021,675
506 4,021,676
574 4,021,713

CLASS 251

133 4,021,015
324 4,021,016

CLASS 252

8.55 D 4,021,356
8.55 R 4,021,355
51.5 A 4,021,357
62.1 P 4,021,358
89 R 4,021,359
99 4,021,360
102 4,021,361
188 4,021,362
301.1 W 4,021,363
316 4,021,364
321 4,021,365
373 4,021,366
411 R 4,021,367
427 4,021,368
428 4,021,369
437 4,021,370
454 4,021,371
465 4,021,372
470 4,021,373
473 4,021,374
501 4,021,375
542 4,021,376
546 4,021,377

CLASS 254

8 B 4,021,017
93 H 4,021,018
172 4,021,019

CLASS 256

1 4,021,020

CLASS 259

8 4,021,021
18 4,021,022
73 4,021,023
109 4,021,024

CLASS 260

2.5 AM 4,021,383
2.5 AN 4,021,379
2.5 AP 4,021,384
2.5 AZ 4,021,381
2.5 BB 4,021,385
2.5 BC 4,021,386
2.5 BE 4,021,378
2.5 HA 4,021,380
2.5 M 4,021,382
8 4,021,387
13 4,021,388
17.4 ST 4,021,389
22 CB 4,021,390
27 BB 4,021,391
28.5 A 4,021,392
28.5 AS 4,021,393
29.2 R 4,021,395
29.4 UA 4,021,394
29.6 H 4,021,399
29.6 MM 4,021,398
29.6 N 4,021,397
29.6 NR 4,021,396
30.2 4,021,400
37 N 4,021,401
42.12 4,021,402
42.28 4,021,403
42.32 4,021,404
45.75 B 4,021,406
45.75 J 4,021,407
45.8 R 4,021,405
45.85 T 4,021,408
47 CP 4,021,409
59 EP 4,021,410
63 N 4,021,412
69 R 4,021,413
77.5 AM 4,021,414
78 TF 4,021,415
79.7 4,021,416
4,021,417
112.5 R 4,021,418
128 4,021,419
239 B 4,021,420
239.3 A 4,021,422
239.3 D 4,021,421
239.55 D 4,021,423
240 R 4,021,425
243 C 4,021,426
249.8 4,021,424
293.51 4,021,429
293.53 4,021,430
293.61 4,021,431
293.64 4,021,432
293.7 4,021,428
294.8 D 4,021,433
4,021,435
294.8 E 4,021,436
294.8 R 4,021,434
296 R 4,021,437
302 R 4,021,438
306.8 D 4,021,439
307 D 4,021,440
308 R 4,021,441
309 4,021,442
4,021,443
309.6 4,021,444
310 A 4,021,445
326.12 R 4,021,448
326.24 4,021,449
326.4 4,021,446
326.8 4,021,447
332.2 A 4,021,450
4,021,451
346.8 A 4,021,427
347.3 4,021,452
348.5 L 4,021,453
4,021,454
370 4,021,455
378 4,021,456
383 4,021,457
397.45 4,021,459
397.5 Re.29,199
4,021,458
400 4,021,460
410.9 N 4,021,461
419 4,021,462
429 R 4,021,463
462 R 4,021,464
465.8 R 4,021,465
468 D 4,021,467
468 G 4,021,466
470 4,021,468
471 C 4,021,469
471 R 4,021,470
4,021,471
472 4,021,472
473 R 4,021,473
485 G 4,021,474
491 4,021,475
497 R 4,021,476
514 D 4,021,477
515 R 4,021,478
520 B 4,021,479
534 M 4,021,480
558 A 4,021,481
561 S 4,021,482
562 B 4,021,483
567.6 P 4,021,484
570.6 4,021,485
573 4,021,486
580 4,021,487
586 C 4,021,491
586 R 4,021,488
4,021,489
4,021,490
592 4,021,492
600 A 4,021,493
601 R 4,021,411

613 D Re.29,200
Re.29,201
617 F 4,021,494
621 A 4,021,495
637 P 4,021,496
638 B 4,021,497
645 4,021,498
674 SA 4,021,499
680 E 4,021,500
683 R 4,021,501
683.15 R 4,021,502
831 4,021,503
836 4,021,504
856 4,021,505
868 4,021,506
873 4,021,507
876 R 4,021,508
880 R 4,021,509
891 4,021,510
942 Re.29,202

CLASS 261

44 A 4,021,511
4,021,512
50 A 4,021,513

CLASS 264

3 E 4,021,514
40.5 4,021,515
85 4,021,517
92 4,021,518
96 4,021,519
103 4,021,520
108 4,021,521
138 4,021,522
209 4,021,523
242 4,021,524

CLASS 266

58 4,021,025
275 4,021,026

CLASS 269

32 4,021,027
41 4,021,516
325 4,021,028

CLASS 270

31 4,021,029

CLASS 271

11 4,021,030
166 4,021,032

CLASS 272

70.3 4,021,033
73 4,021,034
78 4,021,035
123 4,021,040

CLASS 273

29 A 4,021,036
30 4,021,037
80.1 4,021,038
85 B 4,021,039
106.5 R 4,021,041
131 AB 4,021,043
131 AD 4,021,042
135 A 4,021,044
136 D 4,021,045
148 R 4,021,046
167 H 4,021,047

CLASS 274

1 R 4,021,048

CLASS 277

11 4,021,049
75 4,021,050

CLASS 279

1 N 4,021,051

CLASS 280

11.2 4,021,052
11.36 4,021,053
11.37 R 4,021,054
153 R 4,021,055
613 4,021,056
735 4,021,057
737 4,021,058

CLASS 282

27.5 4,021,059
28 R 4,021,060

CLASS 285

13 4,021,061
39 4,021,062

CLASS 290

40 R 4,021,677

CLASS 292

67 4,021,063
111 4,021,064
144 4,021,065
4,021,066
256.5 4,021,067

CLASS 294

19 A 4,021,068

CLASS 296

1 S 4,021,069
19 4,021,070
62 4,021,071
71 4,021,072
137 B 4,021,073

CLASS 298

22 R 4,021,074

CLASS 299

30 4,021,075
56 4,021,076

CLASS 301

13 SM 4,021,077

CLASS 302

24 4,021,078

CLASS 303

3 4,021,079
92 4,021,080

CLASS 305

35 R 4,021,081
54 4,021,082

CLASS 307

64 4,021,678
117 4,021,679
216 4,021,680
233 A 4,021,681
252 UA 4,021,683
268 4,021,684
4,021,685
291 4,021,686
300 4,021,687
362 4,021,682

CLASS 308

4 A 4,021,083
8.2 4,021,084
187.2 4,021,085
189 R 4,021,086

CLASS 310

8.7 4,021,688
41 4,021,689
67 R 4,021,690
217 4,021,691
237 4,021,692

CLASS 312

195 4,021,087
257 R 4,021,089
311 4,021,088

CLASS 313

99 4,021,693
181 4,021,694
188 4,021,695
229 4,021,696

CLASS 315

39.3 4,021,697
106 Re.29,204
241 P 4,021,698

CLASS 318

39 4,021,710
432 4,021,712
480 4,021,711
594 4,021,714
628 4,021,715
648 4,021,716

CLASS 320

39 4,021,717
48 4,021,718

CLASS 321

12 4,021,719
44 4,021,720
47 4,021,721

CLASS 323

4 4,021,722
50 4,021,723

CLASS 324

3 4,021,725
.5 A 4,021,726
20 CR 4,021,724
20 R 4,021,727
41 4,021,728
51 4,021,729
52 4,021,730
4,021,731
53 4,021,732
61 R 4,021,733
94 4,021,734
158 P 4,021,735
181 4,021,736

CLASS 325

36 4,021,737
323 4,021,738
364 4,021,739

CLASS 328

29 4,021,740
69 4,021,741

CLASS 329

50 4,021,742
103 4,021,743
105 4,021,744

CLASS 330

10 4,021,745
13 4,021,746
4,021,747
15 4,021,748
22 4,021,749
34 4,021,750
35 4,021,751

CLASS 331

17 4,021,752
94.5 C 4,021,754
94.5 D 4,021,753
96 4,021,755
117 R 4,021,756

CLASS 332

19 4,021,757
21 4,021,758

CLASS 333

70 R 4,021,759
4,021,760
72 4,021,761
4,021,762

CLASS 335

284 4,021,763

CLASS 336

84 4,021,764

CLASS 337

159 4,021,765

CLASS 338

2 4,021,766
32 H 4,021,767
180 4,021,768
299 4,021,769
332 4,021,770

CLASS 339

.5 R 4,021,090
75 MP 4,021,091
103 R 4,021,092
198 H 4,021,093
246 4,021,094
276 SF 4,021,095

CLASS 340

5 H 4,021,771
15.5 DP 4,021,772
18 LD 4,021,773
18 R 4,021,774
71 4,021,775
146.3 AC 4,021,778
146.3 AH 4,021,777
146.3 MA 4,021,776
172.5 4,021,779
4,021,780
4,021,781
4,021,782
4,021,783
4,021,784
4,021,785
173 CA 4,021,788
173 FF 4,021,786
173 R 4,021,787
4,021,789
174 TF 4,021,790
4,021,791
237.5 4,021,792
248 A 4,021,793
248 R 4,021,794
272 4,021,795
274 C 4,021,796
310 A 4,021,797
324 M 4,021,798
347 AD 4,021,799
4,021,800

CLASS 343

5 DP 4,021,801
6.5 LC 4,021,802
7 PF 4,021,803
17.1 R 4,021,804
17.2 PC 4,021,805
108 R 4,021,806
112 R 4,021,807
113 R 4,021,808
715 4,021,809
727 4,021,815
731 4,021,810
742 4,021,811
753 4,021,812
768 4,021,813
786 4,021,814
840 4,021,816
912 4,021,817

CLASS 346

140 R 4,021,818

CLASS 350

6 4,021,096
96 C 4,021,097
4,021,098
4,021,099
160 R 4,021,100
255 4,021,101

CLASS 351

13 4,021,102
126 4,021,103

CLASS 352

14 4,021,104

CLASS 353

119 4,021,105

CLASS 354

1 4,021,819
4,021,820
25 4,021,821
31 4,021,822
4,021,823
33 4,021,824
79 4,021,825
209 4,021,826
212 4,021,827
217 4,021,828
219 4,021,829
225 4,021,830
295 4,021,831
298 4,021,832

CLASS 355

3 R 4,021,106
4,021,107
4,021,108
8 4,021,109
10 4,021,110
4,021,111
14 4,021,112
15 4,021,113
41 4,021,114
56 4,021,115

CLASS 356

4 4,021,116
39 4,021,117
156 4,021,118
159 4,021,119
208 4,021,120
237 4,021,121
240 4,021,122
244 4,021,123
246 4,021,124

CLASS 357

15 4,021,833
19 4,021,834
23 4,021,835
30 4,021,836
31 4,021,844
39 4,021,837
68 4,021,838
74 4,021,839

CLASS 358

22 4,021,841
24 4,021,842
29 4,021,843
75 4,021,845
92 4,021,846
101 4,021,840
113 4,021,847
130 4,021,606
162 4,021,848
165 4,021,849
230 4,021,607
245 4,021,850
297 4,021,605
302 4,021,851

CLASS 360

38 4,021,852
44 4,021,853
62 4,021,854
69 4,021,855
74 4,021,856
84 4,021,857

CLASS 361

11 4,021,699
18 4,021,701
28 4,021,700
77 4,021,704
85 4,021,703
103 4,021,702
210 4,021,706
229 4,021,709
284 4,021,707
295 4,021,708
402 4,021,705

CLASS 364

724 4,021,654

CLASS 401

213 4,021,125

CLASS 403

9 4,021,126
171 4,021,127
217 4,021,128
252 4,021,129
275 4,021,130

CLASS 404

25 4,021,131

CLASS 408

127 4,021,132
141 4,021,133
204 4,021,134

CLASS 415

2 4,021,135
111 4,021,136
147 4,021,137

CLASS 416

95 4,021,138
97 R 4,021,139
117 4,021,140
141 4,021,141
167 4,021,142
174 4,021,143

CLASS 417

40 4,021,144
4,021,145
76 4,021,146
138 4,021,147
218 4,021,154
302 4,021,155
346 4,021,156
383 4,021,148
387 4,021,157
390 4,021,164
395 4,021,149
411 4,021,150
417 4,021,151
4,021,152
443 4,021,153

CLASS 418

52 4,021,158
61 B 4,021,159
4,021,161
61 R 4,021,160
82 4,021,162
83 4,021,163
111 4,021,165
183 4,021,166

CLASS 423

184 4,021,525
4,021,526
206 T 4,021,527
308 4,021,528
325 4,021,529
489 4,021,530
492 4,021,531
544 4,021,532
610 4,021,533

CLASS 424

1 4,021,534
4,021,535
47 4,021,536
54 4,021,537
60 4,021,538
73 4,021,539
86 4,021,540
92 4,021,541
180 4,021,542
4,021,543
4,021,544
4,021,545
182 4,021,546
4,021,547
195 4,021,548
4,021,577
220 4,021,549
244 4,021,550
246 4,021,551
247 4,021,552
249 4,021,553
250 4,021,554
4,021,555
251 4,021,556
256 4,021,557
258 4,021,558
262 4,021,559
263 4,021,560
267 4,021,561
4,021,562
4,021,563
4,021,564
4,021,565
274 4,021,566
4,021,567
281 4,021,568
289 4,021,569
300 4,021,570
4,021,571
317 4,021,572
318 4,021,573
324 4,021,574
329 4,021,575
330 4,021,576
364 4,021,578

CLASS 425

7 4,021,167
28 R 4,021,168
71 4,021,169
72 R 4,021,170
77 4,021,171
113 4,021,172
115 4,021,173
135 4,021,174
191 4,021,175
313 4,021,176
324 R 4,021,177
325 4,021,178
369 4,021,179
392 4,021,180
450.1 4,021,181
451.6 4,021,182

CLASS 426

11 4,021,579
16 4,021,580
61 4,021,581
99 4,021,582
134 4,021,583
242 4,021,584
332 4,021,585

CLASS 427

17 4,021,586
18 4,021,587
68 Re.29,203
215 4,021,588

CLASS 428

68 4,021,589
186 4,021,590
200 4,021,591
209 4,021,592
300 4,021,593
303 4,021,594
307 4,021,595
375 4,021,596

CLASS 429

119 4,021,597
206 4,021,598

CLASS 431

2 4,021,183
7 4,021,184
4,021,185
10 4,021,186
20 4,021,187
158 4,021,188
202 4,021,189
280 4,021,190
353 4,021,191

CLASS 432

13 4,021,192
58 4,021,193
78 4,021,194
80 4,021,195

CLASS 526

124 4,021,599

CLASS 528

484 4,021,600

CLASS 536

17 4,021,601

D2—	239	244,156		47	244,170		192	244,183			244,207	D15—	21	244,190	D25—	87	244,201
D6—	60	244,159		68	244,171		200	244,184			244,208		28	244,191	D30—	16	244,216
	63	244,160		85	244,172		212	244,185			244,209			244,192	D34—	4 R	244,217
		244,161		163	244,173			244,186			244,210		123	244,193			244,218
	69	244,162	D8—	331	244,174			244,187			244,211			244,194		5 BC	244,219
		244,163		397	244,175			244,188		54	244,205			244,195			244,220
	71	244,164	D9—	156	244,176			244,189		69	244,230		199	244,226		5 J	244,221
	166	244,165		170	244,177	D13—	1	244,204		70	244,227	D16—	65	244,196		5 SS	244,222
	191	244,166	D10—	103	244,203	D14—	5	244,212			244,228	D19—	13	244,197		13 A	244,223
	192	244,157		126	244,178			244,229		80	244,231		79	244,198		15 B	244,224
	242	244,158			244,179						244,232	D23—	97	244,199	D47—	6 E	244,225
D7—	5	244,167	D12—	71	244,180		11	244,202									
	33	244,168		142	244,181		37	244,213		96	244,214		150	244,200	D64—	11 A	244,233
	46	244,169		156	244,182		53	244,206			244,215	D24—	21	244,235		11 B	244,234

CLASSIFICATION OF PLANTS

P.—	3	4,048		22	4,046		24	4,047									

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

106—	10	T958,001	260—	2.3	T958,004		75 T	T958,006	323—	19	T958,008	350–96 WG		T958,010	429—	157	T958,012
162—	135	T958,002															
227—	1	T958,003		15	T958,005	264—	210 F	T958,007	339—	99 R	T958,009	351—	7	T958,011	526—	350	T958,013

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 4,020,723	4,020,956	4,021,626	4,021,524	4,020,584	4,021,439
4,020,829	4,020,958	4,021,639	4,021,582	4,020,588	4,021,462
4,020,914	4,020,976	4,021,649	4,021,592	4,020,594	4,021,499
4 : 4,020,520	4,020,984	4,021,650	4,021,689	4,020,600	4,021,543
4,020,589	4,021,007	4,021,661	4,021,705	4,020,614	4,021,697
4,020,612	4,021,010	4,021,675	4,021,774	4,020,625	4,021,732
4,020,752	4,021,012	4,021,676	10 : 4,020,577	4,020,631	4,021,741
4,021,009	4,021,020	4,021,700	4,020,654	4,020,706	4,021,756
4,021,017	4,021,034	4,021,716	4,020,656	4,020,715	4,021,793
4,021,330	4,021,035	4,021,737	4,021,396	4,020,787	4,021,796
4,021,393	4,021,037	4,021,743	4,021,400	4,020,798	4,021,809
4,021,401	4,021,041	4,021,766	4,021,429	4,020,809	4,021,848
4,021,682	4,021,047	4,021,780	4,021,489	4,020,818	4,021,850
4,021,701	4,021,048	4,021,785	4,021,600	4,020,819	18 : 4,020,596
4,021,804	4,021,061	4,021,786	11 : 4,021,834	4,020,837	4,020,676
5 : 4,020,681	4,021,065	4,021,788	12 : 4,020,542	4,020,876	4,020,712
4,020,907	4,021,068	4,021,792	4,020,586	4,020,891	4,020,721
6 : 4,020,513	4,021,069	4,021,801	4,020,590	4,020,927	4,020,728
4,020,519	4,021,080	4,021,805	4,020,638	4,020,930	4,020,771
4,020,523	4,021,082	4,021,836	4,020,653	4,020,932	4,021,180
4,020,532	4,021,084	4,021,840	4,020,677	4,020,947	4,021,375
4,020,535	4,021,091	4,021,845	4,020,780	4,020,957	4,021,377
4,020,543	4,021,098	4,021,846	4,020,784	4,020,959	4,021,553
4,020,544	4,021,114	8 : 4,020,826	4,020,815	4,020,963	4,021,562
4,020,549	4,021,147	4,020,856	4,020,841	4,020,970	4,021,581
4,020,555	4,021,197	4,021,013	4,020,902	4,020,977	4,021,768
4,020,563	4,021,224	4,021,119	4,020,933	4,020,996	19 : 4,020,533
4,020,583	4,021,236	4,021,231	4,020,943	4,020,999	4,020,565
4,020,603	4,021,267	4,021,240	4,020,949	4,021,024	4,020,592
4,020,672	4,021,268	4,021,622	4,021,537	4,021,036	4,020,682
4,020,696	4,021,270	4,021,630	4,021,548	4,021,046	4,020,731
4,020,737	4,021,271	4,021,640	4,021,577	4,021,049	4,020,804
4,020,738	4,021,280	4,021,821	4,021,578	4,021,050	4,020,961
4,020,770	4,021,291	9 : 4,020,575	4,021,604	4,021,064	4,021,055
4,020,785	4,021,300	4,020,613	4,021,615	4,021,066	4,021,646
4,020,789	4,021,324	4,020,615	4,021,616	4,021,067	4,021,647
4,020,795	4,021,328	4,020,679	4,021,620	4,021,088	4,021,658
4,020,810	4,021,343	4,020,699	4,021,653	4,021,128	20 : 4,020,694
4,020,814	4,021,348	4,020,700	4,021,654	4,021,155	4,020,888
4,020,824	4,021,351	4,020,827	4,021,662	4,021,183	4,020,913
4,020,828	4,021,362	4,020,832	4,021,725	4,021,203	4,021,169
4,020,834	4,021,363	4,020,855	4,021,790	4,021,212	4,021,225
4,020,836	4,021,366	4,020,866	4,021,794	4,021,260	4,021,290
4,020,853	4,021,380	4,021,063	4,021,808	4,021,273	4,021,546
4,020,854	4,021,389	4,021,090	4,021,816	4,021,295	4,021,832
4,020,861	4,021,420	4,021,123	13 : 4,020,793	4,021,305	21 : 4,020,644
4,020,863	4,021,454	4,021,142	4,021,670	4,021,335	4,020,850
4,020,879	4,021,461	4,021,184	4,021,795	4,021,360	4,021,635
4,020,889	4,021,511	4,021,215	16 : 4,020,601	4,021,372	4,021,642
4,020,906	4,021,512	4,021,261	4,020,692	4,021,381	22 : 4,020,777
4,020,920	4,021,535	4,021,412	17 : 4,020,515	4,021,394	4,020,847
4,020,924	4,021,556	4,021,486	4,020,561	4,021,399	23 : 4,020,742
4,020,925	4,021,573	4,021,505	4,020,574	4,021,402	4,020,762

4,021,191
4,021,306
24 : 4,020,527
4,020,714
4,020,765
4,020,966
4,020,981
4,021,623
4,021,726
4,021,740
4,021,758
4,021,759
4,021,760
4,021,813
25 : 4,020,559
4,020,576
4,020,647
4,020,662
4,020,843
4,020,846
4,020,848
4,020,849
4,020,910
4,021,002
4,021,031
4,021,033
4,021,045
4,021,052
4,021,097
4,021,148
4,021,202
4,021,241
4,021,277
4,021,346
4,021,387
4,021,416
4,021,417
4,021,589
4,021,614
4,021,671
4,021,684
4,021,694
4,021,739
4,021,754
4,021,776
4,021,803
4,021,812
4,021,818
4,021,825
26 : 4,020,511
4,020,512
4,020,521
4,020,536
4,020,539
4,020,579
4,020,602
4,020,609
4,020,617
4,020,630
4,020,634
4,020,661
4,020,683
4,020,686
4,020,708
4,020,732
4,020,753
4,020,823
4,020,839
4,020,870
4,020,894
4,020,918
4,020,937
4,020,946
4,020,955
4,020,960
4,020,978
4,021,027
4,021,038
4,021,072
4,021,073
4,021,077
4,021,085
4,021,133
4,021,135
4,021,145

4,021,176
4,021,200
4,021,253
4,021,378
4,021,385
4,021,441
4,021,467
4,021,478
4,021,530
4,021,575
4,021,643
4,021,644
4,021,679
4,021,681
4,021,706
27 : 4,020,582
4,020,587
4,020,610
4,020,754
4,020,783
4,020,820
4,020,865
4,021,131
4,021,161
4,021,341
4,021,515
4,021,519
4,021,569
4,021,782
4,021,784
4,021,833
29 : 4,020,560
4,020,730
4,021,321
4,021,322
4,021,585
4,021,690
30 : 4,021,228
4,021,229
4,021,516
31 : 4,020,541
4,020,967
32 : 4,020,674
33 : 4,020,514
4,020,979
4,021,056
4,021,608
4,021,729
4,021,765
4,021,769
34 : Re.29,203
4,020,548
4,020,564
4,020,572
4,020,702
4,020,727
4,020,739
4,020,750
4,020,760
4,020,772
4,020,857
4,020,880
4,020,904
4,020,928
4,020,982
4,021,000
4,021,023
4,021,042
4,021,070
4,021,078
4,021,125
4,021,134
4,021,156
4,021,160
4,021,185
4,021,186
4,021,217
4,021,219
4,021,227
4,021,263
4,021,265
4,021,276
4,021,284
4,021,311
4,021,314

4,021,331
4,021,332
4,021,347
4,021,359
4,021,361
4,021,365
4,021,373
4,021,376
4,021,398
4,021,405
4,021,406
4,021,423
4,021,438
4,021,453
4,021,459
4,021,470
4,021,471
4,021,483
4,021,488
4,021,492
4,021,494
4,021,498
4,021,502
4,021,534
4,021,536
4,021,540
4,021,570
4,021,591
4,021,617
4,021,632
4,021,677
4,021,678
4,021,686
4,021,727
4,021,731
4,021,738
4,021,750
4,021,757
4,021,764
4,021,791
4,021,806
4,021,814
4,021,839
4,021,852
35 : 4,020,605
4,020,898
4,021,753
36 : 4,020,508
4,020,510
4,020,516
4,020,530
4,020,547
4,020,570
4,020,595
4,020,649
4,020,693
4,020,711
4,020,724
4,020,734
4,020,741
4,020,776
4,020,782
4,020,812
4,020,822
4,020,831
4,020,833
4,020,845
4,020,858
4,020,869
4,020,935
4,020,939
4,020,968
4,020,987
4,021,026
4,021,032
4,021,060
4,021,079
4,021,089
4,021,100
4,021,103
4,021,112
4,021,116
4,021,140
4,021,209

4,021,269
4,021,281
4,021,289
4,021,292
4,021,319
4,021,320
4,021,340
4,021,354
4,021,357
4,021,431
4,021,437
4,021,444
4,021,448
4,021,452
4,021,457
4,021,474
4,021,475
4,021,525
4,021,526
4,021,541
4,021,544
4,021,545
4,021,565
4,021,566
4,021,580
4,021,583
4,021,584
4,021,613
4,021,624
4,021,625
4,021,641
4,021,655
4,021,664
4,021,708
4,021,711
4,021,777
4,021,802
4,021,815
4,021,819
4,021,849
37 : 4,020,517
4,020,578
4,020,690
4,020,775
4,020,852
4,021,003
4,021,004
4,021,593
4,021,594
38 : 4,020,974
4,021,028
39 : 4,020,538
4,020,581
4,020,632
4,020,670
4,020,707
4,020,713
4,020,719
4,020,796
4,020,821
4,020,842
4,020,868
4,020,871
4,020,896
4,020,915
4,020,929
4,020,936
4,020,965
4,021,022
4,021,076
4,021,092
4,021,106
4,021,126
4,021,132
4,021,168
4,021,242
4,021,246
4,021,274
4,021,283
4,021,285
4,021,286
4,021,288
4,021,333
4,021,397

4,021,404
4,021,407
4,021,409
4,021,414
4,021,415
4,021,419
4,021,427
4,021,504
4,021,659
4,021,660
4,021,719
4,021,783
40 : 4,020,580
4,020,680
4,020,803
4,020,897
4,020,919
4,021,025
4,021,071
4,021,083
4,021,087
4,021,130
4,021,137
4,021,312
4,021,355
4,021,465
4,021,490
4,021,500
4,021,596
4,021,627
4,021,730
41 : 4,020,518
4,020,666
4,020,726
4,020,778
4,020,938
4,021,631
42 : 4,020,509
4,020,540
4,020,546
4,020,554
4,020,556
4,020,611
4,020,623
4,020,629
4,020,695
4,020,768
4,020,786
4,020,873
4,020,874
4,020,916
4,020,917
4,020,921
4,020,950
4,020,954
4,020,988
4,020,989
4,020,992
4,021,014
4,021,054
4,021,094
4,021,095
4,021,136
4,021,138
4,021,187
4,021,213
4,021,230
4,021,257
4,021,293
4,021,298
4,021,327
4,021,329
4,021,334
4,021,353
4,021,369
4,021,379
4,021,395
4,021,447
4,021,487
4,021,538
4,021,560
4,021,561
4,021,572
4,021,587

4,021,588
4,021,621
4,021,628
4,021,703
4,021,704
4,021,714
4,021,736
4,021,773
4,021,820
4,021,841
4,021,853
44 : 4,020,557
45 : 4,020,525
4,021,043
46 : 4,021,074
47 : 4,020,922
4,020,980
4,021,021
4,021,669
48 : Re.29,204
4,020,553
4,020,585
4,020,619
4,020,697
4,020,744
4,020,779
4,020,792
4,020,794
4,020,864
4,020,923
4,020,940
4,021,029
4,021,174
4,021,190
4,021,201
4,021,214
4,021,266
4,021,317
4,021,323
4,021,356
4,021,383
4,021,384
4,021,496
4,021,599
4,021,656
4,021,666
4,021,667
4,021,772
4,021,781
4,021,807
4,021,837
49 : 4,020,830
4,020,975
4,020,985
4,021,105
50 : 4,020,691
4,020,811
4,020,994
4,021,278
4,021,789
51 : 4,020,507
4,020,567
4,020,736
4,020,941
4,021,192
4,021,216
4,021,523
4,021,552
4,021,579
4,021,718
4,021,847
53 : 4,020,673
4,020,883
4,020,911
4,020,986
4,021,771
54 : 4,020,688
4,021,476
55 : 4,020,651
4,021,252
4,021,338
4,021,568
4,021,597
56 : 4,021,527

1 :	244,170		244,217		244,231		244,220		244,202		244,189
	244,171		244,218		244,232		244,234		244,214		244,216
6 :	244,158		244,223	18 :	244,193	34 :	244,160		244,215	40 :	244,192
	244,165		244,230		244,194		244,161		244,221		244,222
	244,175		244,235		244,195		244,163	37 :	244,166	42 :	244,159
	244,182	9 :	244,205	21 :	244,204	36 :	244,156	39 :	244,167		244,198
	244,206	12 :	244,190	24 :	244,203		244,176		244,173	47 :	244,224
	244,207	17 :	244,157		244,226		244,178		244,185	48 :	244,174
	244,208		244,172	26 :	244,168		244,179		244,186	51 :	244,164
	244,209		244,183		244,184		244,180		244,187		244,191
	244,210		244,201	27 :	244,199		244,197		244,188	55 :	244,213
	244,211										

PLANT PATENTS

6 :	4,047		4,048	18 :	4,046						

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

10 :	T958,002	17 :	T958,001	25 :	T958,011	36 :	T958,003	39 :	T958,004		T958,006
13 :	T958,010	18 :	T958,009	34 :	T958,008		T958,012	47 :	T958,005	51 :	T958,007

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner